IMPORTANT
PAGE 60 WAS ADDED
IT IS NOT A PAGE IN THE REPORT
IT SHOWS DETAIL FROM
ORIGINAL DOCUMENT MISSING
FROM THE SCAN OF PAGE 59

F00432

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. RA-10-10-97

Registry No. F00432

LOCALITY

State Alaska

General Locality Stephens Passage

Sublocality Slocum and Limestone Inlets and Taku Harbor

1997, 1998

CHIEF OF PARTY
CAPT Alan D. Anderson, NOAA

NOAA FORM 77-28 (11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTER NO.
F00432

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.
RA-10-10-97

State: Alaska

General locality: Stephens Passage

Locality: Slocum and Limestone Inlets and Taku Harbor

Scale: 1:10,000 Date of survey: April 22 - June 19, 1997

Instructions dated: 1/30/97, Change #1 4/3/97 * Project No.: OPR-0324-RA

Vessel: RA-1(2121),RA-2(2122),RA-3(2123),RA-4(2124),RA-5(2125),RA-6(2126)

Chief of party: CAPT Alan D. Anderson, NOAA

Surveyed by: NOAA Ship RAINIER Personnel

Soundings taken by echo sounder, ~~hand lead, pole~~ Dives Side Scan Sonar, EG&G Model 260, 272-T, Knudsen 320M, DSF-6000N

Graphic record scaled by: RAINIER Personnel

Graphic record checked by: RAINIER Personnel

Evaluation by: L. Deodato ~~Protracted by~~ Automated plot by: HP Design Jet 650C

Verification by: M. Bigelow, D. Doles, R. Mayor, L. Deodato

Soundings in fathoms ~~feet~~ at ~~MLW~~ MLLW and tenths

REMARKS: All times in UTC, revisions and marginal notes in black were generated during office processing. All separates are filed with the hydrographic data, as a result page numbering may be interrupted or non-sequential.

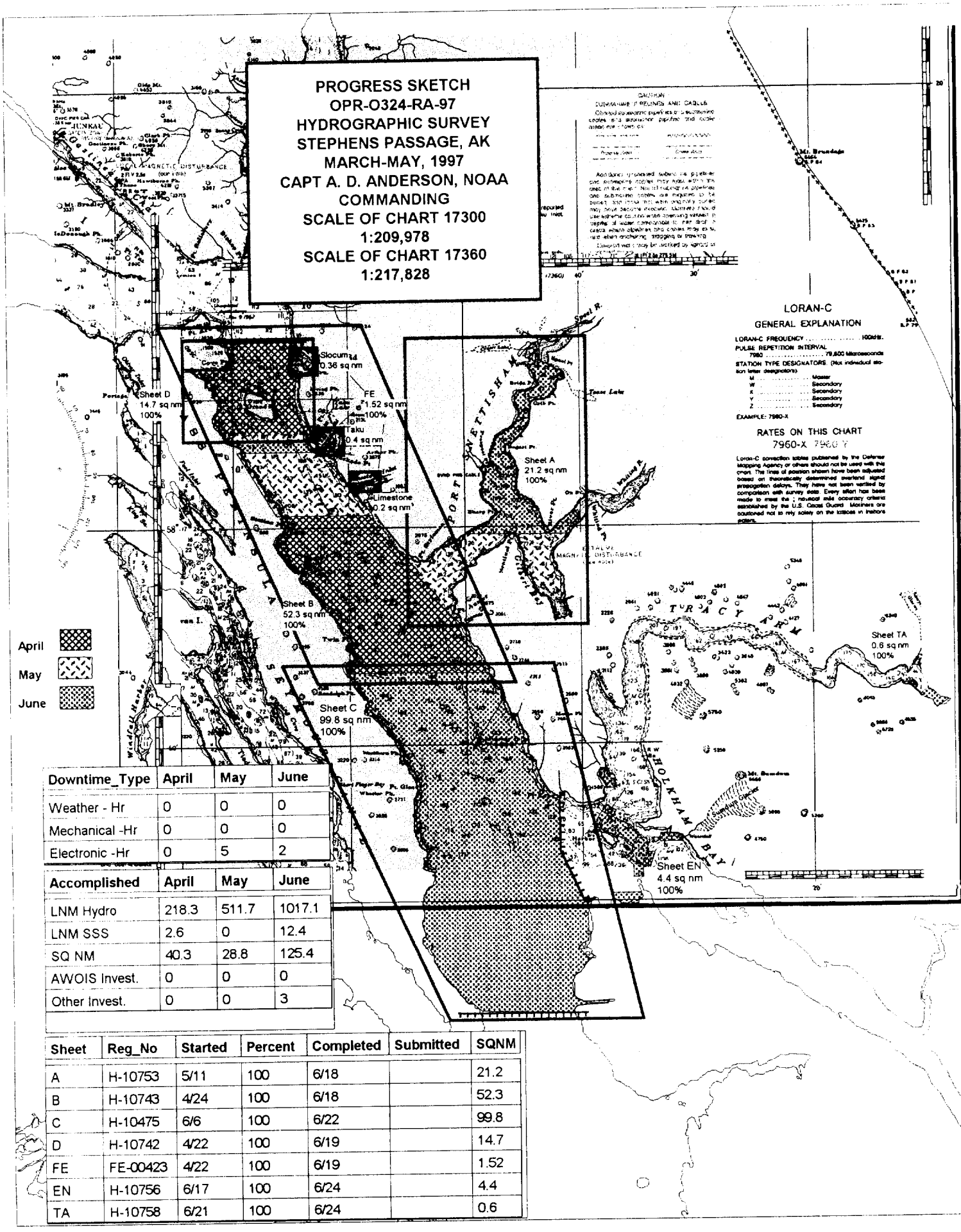
All depths listed in this report are referenced to mean lower low water unless otherwise noted.

* E-mail from HSD POP3 dated May 19, 1998.

AWOIS | SURF 12/7/99 MCR

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537.

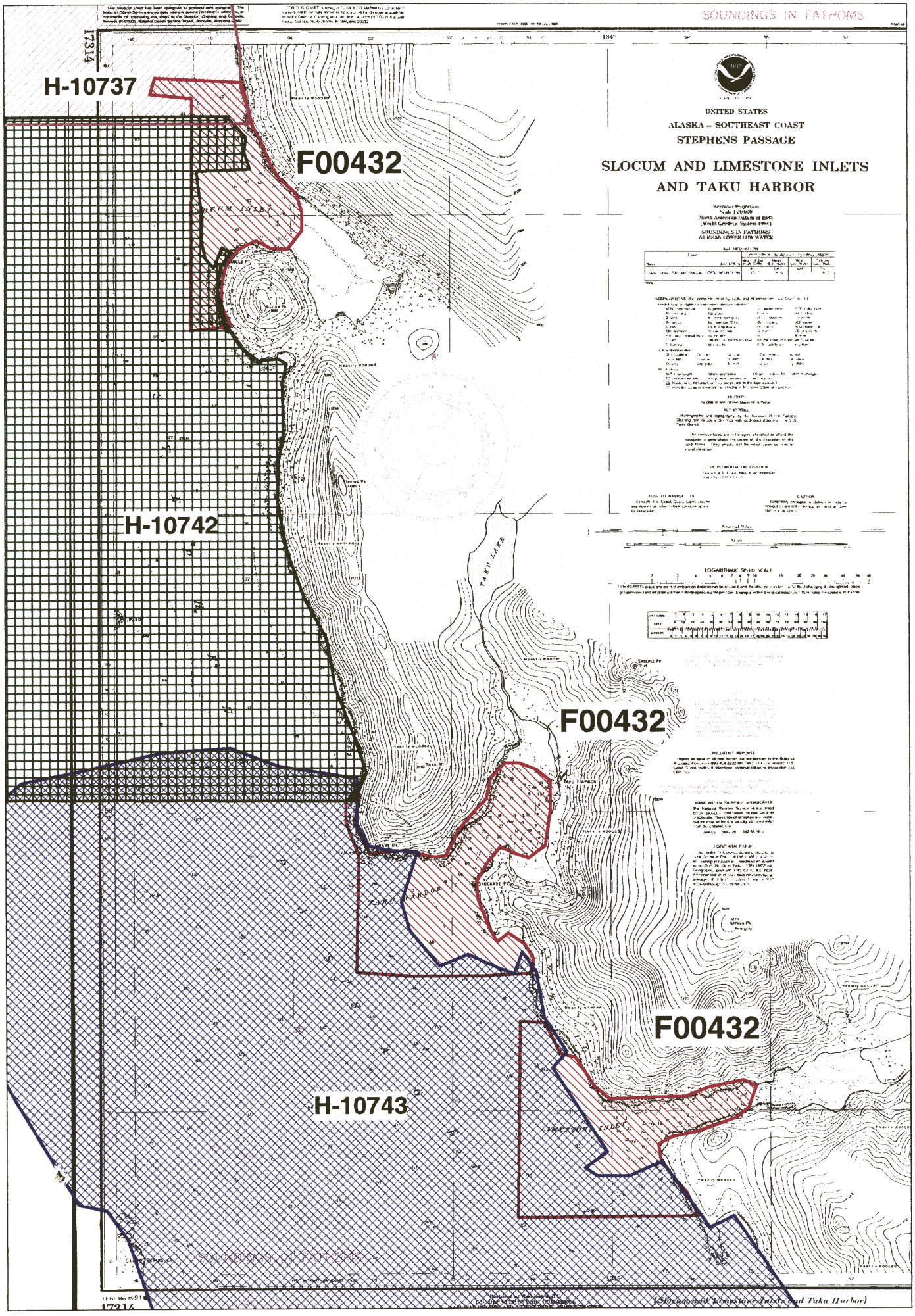
U.S. GOVERNMENT PRINTING OFFICE: 1986 - 652-007/41215



Downtime_Type	April	May	June
Weather - Hr	0	0	0
Mechanical -Hr	0	0	0
Electronic -Hr	0	5	2

Accomplished	April	May	June
LNM Hydro	218.3	511.7	1017.1
LNM SSS	2.6	0	12.4
SQ NM	40.3	28.8	125.4
AWOIS Invest.	0	0	0
Other Invest.	0	0	3

Sheet	Reg_No	Started	Percent	Completed	Submitted	SQNM
A	H-10753	5/11	100	6/18		21.2
B	H-10743	4/24	100	6/18		52.3
C	H-10475	6/6	100	6/22		99.8
D	H-10742	4/22	100	6/19		14.7
FE	FE-00423	4/22	100	6/19		1.52
EN	H-10756	6/17	100	6/24		4.4
TA	H-10758	6/21	100	6/24		0.6


SOUNDINGS IN FATHOMS
17314
H-10737
F00432
H-10742
F00432
F00432
H-10743
UNITED STATES
ALASKA – SOUTHEAST COAST
STEPHENS PASSAGE
SLOCUM AND LIMESTONE INLETS
AND TAKU HARBOR
Mercator Projection
Scale 1:20,000
North American Datum of 1983
(World Geodetic System 1984)
SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER
SLOCUM INLET
TAKU LAKE
TAKU HARBOR
LIMESTONE INLET
17314

Descriptive Report to Accompany Hydrographic Survey FE-00432

Field Number RA-10-10-97
Scale 1:10,000
April - June 1997
NOAA Ship RAINIER
Chief of Party: Captain Alan D. Anderson, NOAA

A. PROJECT ✓

This field exam was completed as specified by Project Instructions OPR-O324-RA dated ~~December 20, 1996~~ January 30, 1997. Survey FE-00432 corresponds to sheet FE as defined in the sheet layout. This survey will provide contemporary hydrographic survey data as part of a continuing program to improve chart coverage of the Inside Passage in southeast Alaska. Requests for hydrographic surveys and updated charts in this area have been received from the United States Coast Guard (USCG), Southeastern Alaska Pilot's Association (SEAPA), the Alaska Department of Transportation, and the Alaska Department of Environment and Conservation in support of cruise line, commercial fishing, mining, and logging industries.

B. AREA SURVEYED ✓ See Eval Report, Section B

The survey area is located in Stephens Passage, Alaska, in the vicinity of Grand Island from Slocum Inlet to ~~Grave Point~~ Limestone Inlet. The field exam includes three separate westward-facing harbors. The survey is bound by the mainland to the east.

The survey's northern limit, north of Slocum Inlet is latitude 58° 08' 52"N. The western limit of the Slocum Inlet is at longitude 134° 05' 12.5"W. The Slocum Inlet survey's southern limit is latitude 58° 07' 14.9"N.

Taku Harbor Survey's northern limit is 58° 04' ~~07~~ 18"N. The western limit is 134° 03' 10"W. 58° 02' 57"N is the southern limit.

Limestone Inlet survey's northern limit is 58° 02' 35"N. Its western limit is 134° 01' 10"W. The field exam's southern limit as well as the Limestone Inlet southern limit is latitude 58° 01' 20"N.

Data acquisition was conducted from April 22 – June 19, 1997 (DN 112-170). Additional work was conducted June 13, 1998. See report attached.

C. SURVEY VESSELS ✓

Data were acquired by RAINIER and her survey launches as noted on the survey information summary provided with this report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

All data were acquired and preliminary processing was accomplished using the Hydrographic Data Acquisition and Processing System (HDAPS). Using exported HDAPS data in MapInfo facilitated charted and prior survey comparisons. Final Detached Positions and Soundings based on predicted tides were saved in MapInfo 4.1 format. A complete listing of software for HDAPS is included in Appendix VI. *

* Filed with the hydrographic data.

E. SONAR EQUIPMENT ✓

Side scan sonar (SSS) operations were conducted in Taku Harbor using EG&G model 260 slant-range corrected SSS recorders and EG&G 272-T-dual channel towfish . The towfish were operated on the 100 kHz frequency. The serial numbers of the towfish and recorders used are summarized below:

VES NO	RECORDER S/N	TOWFISH S/N	CABLE LENGTH
2123	0012106	016989	70 meters
2125	0011443	015598	35 meters

✓

The towfish were deployed manually on the starboard quarter of the launches, attached to the aft fall shackle by line and lead around the stern railings. The length of towcables deployed was determined by noting the measured markings on the towfish cable as these markings met the stern railing. The SSS towfish was adjusted to maintain a height off the bottom of 8 to 20 percent of the range scale. The 100 meter range scale was used. SSS operations were conducted at or less than 5 knots.

One hundred percent SSS collection was conducted in Taku harbor.** The recorder gain setting was adjusted for the best return for changing bottom conditions. Rub tests were conducted prior to operating the SSS. Side scan sonograms were manually scanned for significant contacts in accordance with section 7.3.2 of the project instructions, significant contacts were identified and entered into a HDAPS contact tables. No multi-beam echo sounder equipment was used on this survey. Concur

** The SSS operation was centered at latitude 58/04/03N, 134/01/09W and a radius of 400 meters. One hundred percent side scan coverage was not conducted for the southern and western portions of Taku Harbor. Some 200% side scan coverage was accomplished for charted piles. See discussion, page 4, Shoreline.

F. SOUNDING EQUIPMENT ✓

The Raytheon DSF-6000N is a dual frequency (100 kHz, 24 kHz), stylus trace echo sounder. The Knudsen 320M is a dual frequency, thermal depth sounder using the same transducer frequencies. Serial numbers are included on the headers of the daily Raw Master Printouts.* No new problems, which affect survey data, were encountered. All soundings were acquired in meters using the High + Low, high frequency digitized setting. Concur

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Three sound velocity casts were acquired within the survey area. Refer to the survey information summary for usage and position information. Sound velocity table one was primarily used, as it included depths up to 227 meters. Sound velocity table three was applied in the depths between 227 and 281 meters encountered in inlet entrances. In depths over 281 meters, and in all depths collected after June 18, 1997, table seven was applied because a new sound velocity cast was performed on that date. Concur

The sound velocity casts were acquired with SBE SEACAT Profiler (S/N 219), calibrated December 15, 1996. Velocity correctors were computed using the PC programs SEACAT and VELOCITY, version 3.3 (1997), in accordance with Hydrographic Survey Guideline (HSG) No. 69. A printout of the Sound Velocity Corrector Tables used in the HDAPS Post Survey program is included in the "Separates to be Included with Survey Data, IV Sounding Equipment Calibrations and Corrections".

A static transducer depth was determined using FPM Fig 2.2 for vessels 2121, 2122, 2123, and 2125 in the spring of 1997. The static draft and offsets for RAINIER, 2120, were collected in

* Filed with the hydrographic data.

1995. Settlement and squat correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2, using FPM Fig. 2.3, and are included with project data for OPR-O324-RA-97. The data for vessels 2121, 2122, and 2123 were collected in Shilshole Bay, Washington in March 1997. The data for 2124 and 2126 were collected in 1996. The data for vessel 2125 were collected in Young Bay, Alaska in March 1997. All offset tables* contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables 1-6 correspond to the last digit of the vessel number. The offset tables are included with project data for OPR-O324-RA-97. The launches are not equipped with heave, roll and pitch sensors. Concur

The Coastal and Estuarine Oceanography Branch (N/OES334) through N/CS31 provided predicted tides for the project on diskette for the Juneau, Alaska reference station (945-2210). HDAPS listings of the data used in generating tide corrector tables are included in Appendix V* of this report. Tidal correctors as provided in the project instructions for H-10742 are listed in the survey information summary. (attached to report)

Juneau, Alaska (945-2210), and Ketchikan, Alaska (945-0460, are the primary control stations for datum determination at all subordinate stations. RAINIER personnel installed a Sutron 8200 tide gage at Taku Harbor (945-2123) on April 21, 1997, which was removed on June 19, 1997. RAINIER personnel installed a Sutron 8200 tide gage at Speel River (945-2081) on April 16, 1997, and removed it June 19, 1997. Crib Point tide gage (945-2082) was installed June 4, 1997 and removed June 19, 1997. Refer to the Field Tide Notes and supporting data in Appendix V* for individual gage performance and level closure information. This information and the boundaries of the survey have been forwarded to N/OES212. A request for approved tides was forwarded to N/OES23 in accordance with FPM 4.2.3. Approved Tide Note dated Nov. 17, 1997 is attached.

Use of Taku Harbor tide gage data is recommended for final tide correctors. Do not Concur
Final approved tides are from Juneau.

H. CONTROL STATIONS See Evel Rpt., section H.

The horizontal datum for this project is NAD 83. The control stations used for this survey are listed in Appendix III.** See the OPR-O324-RA-97 Horizontal Control Report for more information.

I. HYDROGRAPHIC POSITION CONTROL See Evel Rpt., Section I.

All soundings were positioned using differential GPS. Primary control was TWIN, the VHF differential reference station installed by RAINIER. The US Coast Guard Beacon at GUSTAVUS was used when not using the VHF station. Launch-to-launch DGPS performance checks were performed in accordance with Section 3.4.4 of the FPM. Two observations of position were made from two different DGPS base stations, TWIN and GUSTAVUS, while the launches were rafted together with their GPS antennae within 2-3 meters of each other. RAINIER also used SHIPDIM, version 2.2R (April 1996) with a Trimble Centurion P-code receiver and an Ashtech sensor (both differentially-corrected) to monitor the performance of the USCG Beacon. TWIN was compared to GUSTAVUS during 8-hour daily comparisons and occasional performance checks. Some outliers were noted, but none indicated systematic or continuous errors. The SHIPDIM OUTLIER.SUM results are included on a floppy in the project data for OPR-O324-RA.

Problems with GPS control were encountered in Limestone Inlet due in large part to mountains obstructing satellite signals. Data were rejected and rerun until standards of Field Procedures Manual were met. Concur

* Filed with the hydrographic data.
** Copy attached to this report.

J. SHORELINE ✓ See Eval Rpt., Section J

The shoreline manuscript from Coastal Mapping survey CM-8809 was supplied by N/CS341 in Standard Digital Data Exchange Format (SDDEF). The digital files from DM-10304--DM-10315 were projected to the survey grid with OPR-O324-RA-97 geodetic parameters using program Shore version 2.0, provided by N/CS32, and plotted on the survey using HDAPS.

Limited shoreline verification was conducted in accordance with the Project Instructions. For this survey the limit of safe navigation of a survey launch is 1-5 meters offshore of apparent low tide, generally 3-40 meters of depth at Mean Lower Low Water. Features shown inshore of the NALL are the hydrographer's representation of the shoreline while slowly transiting along the shore, and are intended to aid chart compilation. Shoreline manuscript and field features were compared to an enlargement of chart 17314, which is included in the submittal. Shoreline verification items were analyzed during office processing and shown on the smooth sheet as warranted.

Shoreline Manuscript and Chart Shoreline Changes:

Slocum Inlet:

New rock inshore of the NALL line at approximate position 58° 07' 53.61"N, 133° 03' 52.87"W (near fix number 10006), 0.5 M height above beach. This GP was not used to transfer the rock to the smooth sheet. Rock was portrayed based on substandard positioning and has been noted in the evaluation report. (See Eval Rpt., Section J.)

New rock at position 58° 07' 46.99"N, 134° 04' 45.99"W, (fix number 10012), 0.9 M. ✓ Rock has been incorporated as part of ledge.

Taku Harbor:

Taku Harbor has piles left over from the ruins of docks** inshore of the one-meter curve. Estimated position 58° 04' 22"N, 134° 00' 45"W* is centered on pile ruins in a 3 M X 30 M dock configuration perpendicular to shore. A single pile is located at est. position 58° 04' 20 "N, 134° 00' 55"W* Estimated position 58° 04' 16"N, 134° 00' 43"W* marks ruins of a 2 M X 20 M boardwalk parallel to shore. Two piles are located at estimated position 58° 04' 02"N, 134° 00' 48"W* Finally, estimated position 58° 04' 12"N, 134° 00' 46"W* marks the remains of a 20 M X 50 M dock perpendicular to shore. * These GPs were not used to transfer these "see" Field sheet" data to the smooth sheet. See Section J of Eval Report and Section M, Comparison with Prior Surveys. ** Ruins have been transferred from T-3810. Retain ruins as charted.

A stranded wreck of a pleasure craft, about 13 ft. long, at position 58° 04' 06.69"N, 134° 00' 44.82"W (fix number 30024) exposed 0.5 M. This craft is temporary and should not be charted. Do not Concur Chart wreck

The floating dock at position 58° 04' 06.72"N, 134° 00' 47.52"W is charted correctly on the shoreline manuscript. Dock has been shown on the smooth sheet and should be charted to reflect the surveys findings.

A new floating dock, (dimensions 20 M X 20 M) is anchored at position 58° 03' 55.30"N, 134° 00' 56.61"W, (fix number 30026). Shown as Float on the smooth sheet. Chart Float.

A search for piles on the harbor bottom was conducted on day number 114 using side scan sonar, with 100%-200% coverage. No piles were detected. Two significant contacts* were found but not developed at position 58° 04' 15.3"N, 134° 01' 00.6"W (fix number 30036.18) and 58° 04' 04.1"N, 134° 00' 55.0"W (fix number 30031.65). These contacts are located close to the towfish and their height may be exaggerated. The contact at fix 30036.18 was positioned and plotted on the swath plot. The contact at fix 30031.65 was echosounded during sidescan acquisition; a corrected depth of 10.0 M** was found. Refer to section N for details. * Piles to be retained as charted with Subm notation from T-3810/1920. In addition, contacts 30036.18 and 30031.65 have been shown on smooth plot as Submerged obstructions. See "Additional Work" June 13, 1998 (attached).

** 5.6 Fathoms after reduction for approved tides.

Limestone Inlet:

Limestone Inlet's shoreline manuscript correctly portrays an overhead high tension power cable, clearance of 95 feet (not verified, but it is quite high) crossing the inlet from estimated position 58° 02' 06"N, 133° 59' 12"W to 58° 01' 53"N, 133° 59' 04"W. Overhead cable is shown on the smooth sheet from the shoreline manuscript. Retain as charted.

A camel 2 M in length cabled to a rock cliff is located at position 58° 02' 06.24"N, 133° 58' 41.61"W to 58° 02' 06.61"N, 133° 58' 40.58"W, (fixes 50256-50255). Not shown on smooth sheet.

A dilapidated, 20 ft X 8 ft, float is located at position 58° 02' 10.64"N, 133° 58' 17.87"W, (fix number 50258). The float is oriented lengthwise parallel to shore. Float has been portrayed on the smooth sheet, Chart Float.

A manuscript rock at scaled position 58° 02' 10.8"N, 133° 58' 8.7"W was not found at low tide. No search was conducted. The shore is a rock cliff in that position. The hydrographer recommends retaining the manuscript rock. (Concur with clarification) The manuscript rock has been incorporated into the ledge, as shown on the smooth sheet.

White private mooring buoys, (Were Found) at position 58° 02' 03.67"N, 133° 58' 28.62"W, (fix number 50250), and at position 58° 02' 03.28"N, 133° 58' 33.12"W, (fix number 50249). These mooring buoys have been shown on the smooth sheet and are recommended for charting.

A barge and fish pen, seasonally installed from March 15 to May 30, at position 58° 02' 02.13"N, 133° 58' 29.26"W, (fix number 50251 on northeast corner,) position 58° 02' 01.98"N, 133° 58' 30.87"W fix number 50253 on northwest corner). The attached fish pens are located at 58° 02' 00.53"N, 133° 58' 28.91"W, (fix number 50252 on southeast corner,) and position 58° 02' 00.79"N, 133° 58' 31.24"W, (fix number 50254 on southwest corner). Barge and fish pen shown on the smooth sheet. Note has been added to reflect seasonal nature of these features.

K. CROSSLINES

See Eval Rpt, section P.

Crosslines agreed within 1 meter with mainscheme hydrography. There was a total of 3.02 nautical miles of crosslines, comprising 6.2% of mainscheme hydrography. A number of east-west lines were run as part of mainscheme, resulting in a low percentage of crosslines. The favorable comparison of east west to north-south lines eliminated the need for running additional crosslines.

L. JUNCTIONS

See Eval Rpt., Section L

Slocum Inlet survey junctions with H-10737, 1:10,000, 1997 to the north, H-10742 1:20,000, 1997 to the west and south. Taku Harbor survey junctions with H-10742 1:20,000, 1997 to the North and H-10743 1:40,000, 1997 to the west and south. Limestone Inlet survey junctions with H-10743 1:40,000, 1997 to the west. Soundings and contours on these surveys were found to be in good agreement based on predicted tides. Final comparisons will be made at the Pacific Hydrographic Branch (PHB) after reduction to final vertical datum.

M. COMPARISON WITH PRIOR SURVEYS

See Eval Report, Section M

Prior surveys H-1920, 1:80,000, 1888, H-1898, 1:50,000, 1888, H-4147WD, 1:40,000, 1921, H-1922, 1:5,000, 1888, and H-1923, 1:5,000, 1888, cover the area surveyed. Data from the current survey was found to be in good agreement with prior soundings, with some contour differences outside the Taku Harbor entrance noted. The rise to 82.6 fathoms at ~~estimated~~ position 58° 03' 00"N, 134° 02' 26.5"W is not portrayed on H-1920, 1:80,000, 1888. Final comparisons will be done at PHB after reduction to final sounding datum using tidal information collected concurrently with this survey.

N. ITEM INVESTIGATIONS

An echosounder development was not conducted over the two significant SSS contacts in Taku Harbor in depths less than 10 M. The first, (DN 114, vessel number 2123, fix number 30036.18, position 58° 04' 15.3"N, 134° 01' 00.6" W), had no echosounder depth sounding over the contact. The computed least depth of contact, possibly exaggerated by proximity to towfish, is

(0.9-4.2 fathoms after application of approved tides)

1.8 M. The average depth in the 40-M radius area was 4.6 M. The second, with one echosounder pass over the contact indicating a peak at fix 30031.65, (DN 114, vessel number 2123, fix number 30031.65, position latitude 58° 04' 04.1"N, longitude 134° 00' 55"W), needs further development. The computed least depth of contact is computed to be 2.6 M. The average depth within a 40-M radius from the contact is 11.8 M. (5.6 - 7.5 fathoms after application of approved tides) See "Additional Work" dated June 13, 1998 (attached).

Two echosounder developments were conducted in southwest central Taku Inlet, to disprove an apparent shoal in the area. Similar fathometer trace strays were encountered in different locations approximately 15 M apart on DN 119, VN 2125, fix 50064.08 and DN 134, VN 2126, fix 60066.19, and on DN 114, VN 2123, fix 30052.6, indicating that the stray had moved and was probably a school of fish. The side scan trace on DN 114, VN 2123, fix 30052.6 also indicated a school of fish. A 10.4 fathom depth is located in this area as found by the present survey Chart 16Tms 27. See "Additional Work", Item Reference "TH104, dated June 13, 1998 (attached).

No AWOIS or Pre-Survey review items were assigned to this survey. concur

O. COMPARISON WITH THE CHART ✓ See Eval Rpt, Section O

Chart 17314, 1:20,000, 11th Edition, 5/25/91 is the largest scale chart covering the survey area. Comparison of soundings and contours is described in Section M. Shoreline is compared in section J. Final sounding comparisons will be made at PHB after reduction to final vertical datum.

Dangers to Navigation ✓

No dangers were found. The area of this survey is not suitable for large vessels. concur

P. ADEQUACY OF SURVEY ✓ See Eval Rpt, Section P

Field Exam 432 is complete and adequate to supersede prior soundings and features in their common areas. Do Not concur

Q. AIDS TO NAVIGATION ✓ See Eval Rpt., Section Q

Grave Point Light was positioned at 58° 03' 43.91993"N, 134° 03' 04.29002"W to third order class 1 standards using static GPS methods from station TWIN on May 13, 1997. ~~See the attached Section Q insert for detailed comparison of this position to the charted and Light List positions.~~ Refer to the Horizontal Control Report for OPR-O324-RA-97 for data and calculations. See NOAA Form 76-40 attached to this report.

R. STATISTICS ✓

Refer to the survey information summary for mileage run and other statistics. The field examination of Slocum Inlet contained 810 selected soundings. The field examination of Taku Harbor contained 1962 selected soundings. The field examination of Limestone Inlet contained 1258 selected soundings.

S. MISCELLANEOUS ✓

Bottom samples were collected and sent to the Smithsonian in accordance with Project Instructions. Cable areas were not investigated and should remain as charted. Concur

* Filed with the hydrographic data

T. RECOMMENDATIONS ✓

None.

U. REFERRAL TO REPORTS ✓

The following supplemental reports contain additional information relevant to this survey:

Title	Date Sent	Office
OPR-O324-RA Horizontal Control Report	Aug, 1997	N/CS34
OPR-O324-RA 1997 Coast Pilot Report	Aug, 1997	N/CS26
Project related data for OPR-O324-RA	Aug, 1997	N/CS34
Secchi Disk Report	Aug, 1997	N/CS34

Respectfully Submitted,

Joan M. Ruhland

Joan Miranda Ruhland
Survey Technician, NOAA

Approved and Forwarded,

Alan D. Anderson

Alan D. Anderson
Captain, NOAA
Commanding Officer

Survey Information Summary

Project: OPR-O324-97 **Project Name:** STEPHENS PASSAGE

Instructions Dated: 1/30/97 **Project Change Info:**

Change #	Dated
1	4/3/97

Sheet Letter: FE **Registry Number:** H-00432

Sheet Number: RA-10-10-97

Survey Title: Slocum Inlet, Taku Harbor and limestone inlet

Data Acquisition Dates: **From:** 22-Apr-97 112 **To:** 19-Jun-97 170

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2121	3	1			5	1		
2123	1				1	1		
2124	1	1		1				
2125	4	5	2	1	2	1	6	
2126		3	2	1				

Sound Velocity Cast Information

Launch Table #	Ship Table #	Cast DN	Max Depth	Position	Applicable DN
7		169	429.6	57/51/16 133/51/18	164-LSD
3	13	119	281	58/05/04 134/04/54	FSD-122
1		114	236	58/07/12 134/07/48	FSD-163

Tide Zone Information

Zone #	Time Corr.	Height Corr.
SEA8	000 hr 24 min	X1.03

Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
945-2081	SPEEL RIVER	4/16/97	6/19/97
945-0460	KETCHIKAN	1/1/97	12/31/99
945-2210	JUNEAU	1/1/97	12/31/99
945-2123	TAKU HARBOR	4/21/97	6/19/97
945-2082	CRIB POINT	6/4/97	6/19/97

Statistics Summary

Type	Total:
BS	13
DEV	3.06
DP	10
MS	48.36
S/L	9.17
SPLIT	19.9
SSS1	2.6
XL	3.02

Percent XL: 6.2%

SQNM: 1.52

CONTROL STATIONS as of 16 Aug 1997 ✓

No	Type	Latitude	Longitude	H	Cart	Freq	Vel	Code	MM/DD/YY	Station Name
1	F	058:25:06.000	135:41:48.000	0	250	0.0	0.0		03/01/92	GUSTAVUS
~~2~~	~~F~~	~~057:59:22.443~~	~~133:50:34.647~~	~~0~~	~~250~~	~~0.0~~	~~0.0~~		~~03/01/92~~	~~SNET~~
3	F	057:54:43.873	133:59:33.022	0	250	0.0	0.0		03/01/92	TWIN
4	F	057:50:12.165	133:48:50.563	0	250	0.0	0.0		03/01/92	MIDWAY ISLAND LT

NOAA FORM 76-40
(8-74)

Repalces C&GS Form 567

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- [x] HYDROGRAPHIC PARTY
- [ ] GEODETIC PARTY
- [ ] PHOTO FIELD PARTY
- [ ] COMPILATION ACTIVITY
- [ ] FINAL REVIEWER
- [ ] QUALITY CONTROL & REVIEW GRP.
- [ ] COAST PILOT BRANCH

(See reverse for responsible personnel)

[ ] TO BE CHARTED [x] TO BE REVISED [ ] TO BE DELETED	**REPORTING UNIT** *(Field Party, Ship or Office)* RAINIER	**STATE** ALASKA	**LOCALITY** Various Inlets and Harbors, Stephens Passage	**DATE** 13-May-97

The following objects HAVE [ ] HAVE NOT [ ] *been inspected from seaward to determine their value as landmarks.*

OPR PROJECT NO.	**JOB NUMBER**	**SURVEY NUMBER**	**DATUM**
OPR-O324-RA		FE-00432	

CHARTING NAME	**DESCRIPTION** *(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)*	**POSITION** LATITUDE ° '	LATITUDE " D.M. Meters	LONGITUDE ° '	LONGITUDE " D.P. Meters	**METHOD AND DATE OF LOCATION** *(See instructions on reverse side)* OFFICE	FIELD	**CHARTS AFFECTED**
L.L.# 23645	Grave Point Light Fl W 2.5s	58 03	43.92 1359	134 03	4.29 74		F-GPS-L 5/13/97	17300 17314

RESPONSIBLE PERSONNEL		
TYPE OF ACTION	**NAME**	**ORIGINATOR**
OBJECTS INSPECTED FROM SEAWARD		☐ PHOTO FIELD PARTY ☒ HYDROGRAPHIC PARTY ☐ GEODETIC PARTY ☐ OTHER
POSITIONS DETERMINED AND/OR VERIFIED	Capt. A.D. Anderson	FIELD ACTIVITY REPRESENTATIVE
		OFFICE ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW		☐ REVIEWER ☐ QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64)

OFFICE

1. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E (C) 6042
8 - 12 - 75

FIELD

1. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

F - Field	P - Photogrammetric
L - Located	Vis - Visually
V - Verified	
1 - Triangulation	5 - Field identified
2 - Traverse	6 - Theodolite
3 - Intersection	7 - Planetable
4 - Resection	8 - Sextant

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F - 2 - 6 - L
8 - 12 - 75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont.)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P - 8 - V
8 - 12 - 75
74L (C) 2982

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8 - 12 - 75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8 - 12 - 75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

NOAA FORM 76-40 (8-74)

SUPERSEDES NOAA FROM 76-40 (2-71) WHICH IS OBSOLETE, AND EXISTING STOCK SHOULD BE DESTROYED UPON RECEIPT OF REVISION.

☆ U.S. GPO: 1975-0-665-080/1155

APPROVAL SHEET

for

FE00432

Standard field surveying and processing procedures were followed in producing this examination in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1994.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

DATE: September 10, 1997

Approved and Forwarded,

Alan D. Anderson
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: November 17, 1997

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR-O324-RA
HYDROGRAPHIC SHEET: FE-00~~423~~ 432

LOCALITY: Stephens Passage, AK. (Sheet FE)

TIME PERIOD: April 22 - June 20, 1997

TIDE STATION USED: 945-2123 Taku Harbor, AK.
Lat. 58° 04.1'N Lon. 134° 00.6'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.531 meters

TIDE STATION USED: 945-2210 Juneau, AK.
Lat. 58° 17.9'N Lon. 134° 24.7'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.674 meters

TIDE STATION USED: 945-2249 Young Bay, AK.
Lat. 58° 11.0'N Lon. 134° 35.2'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.690 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SEA8
Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (Meters), relative to MLLW and on Greenwich Mean Time.

Note 2:
Juneau, AK was used as control for datum determination for all subordinate tide stations for this survey. Relative sea level trends show that the areas of Juneau Alaska are undergoing continual uplift. The relative sea level trend observed at Juneau for the time period 1950 through 1993 is -0.0114 m/yr. with a standard error of 0.0005 m/yr. As a result of high rate of sea level change, the 1960 to 1978 Tidal Epoch value of Mean Lower Low Water (MLLW) used as chart datum and reference datum for NOS tidal predictions does not reflect present conditions. The data are under review to determine an updated value of MLLW. An interim value was computed for Juneau, based on the series of data from 1989 to 1991 and controlled by the 1960-1978 Epoch datums at Ketchikan which is more stable. The provided values adjust the chart datum to a more realistic level and in a direction that is more conservative for navigation purposes.

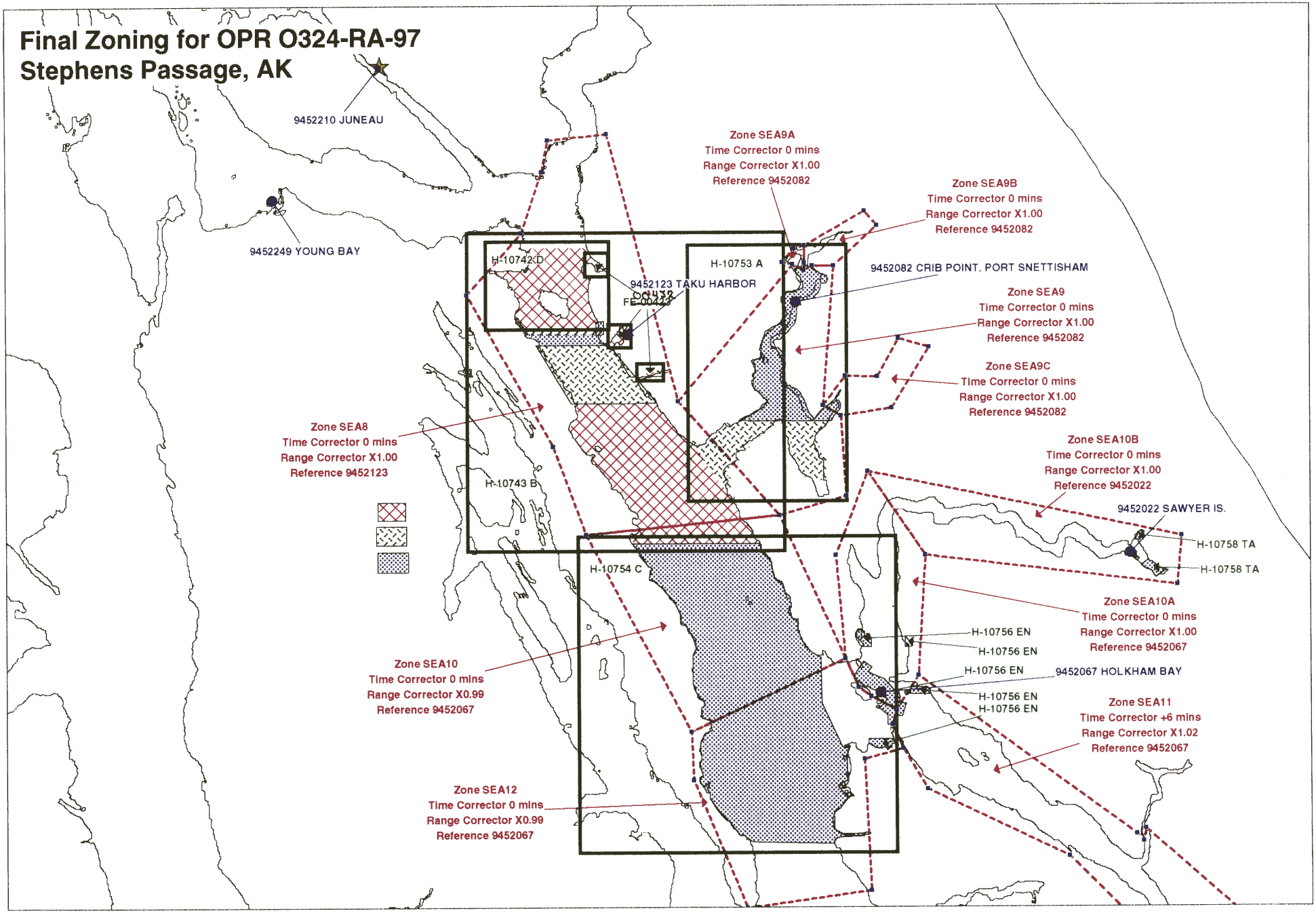
CHIEF, OPERATIONAL ANALYSIS BRANCH

Final tide zone node point locations for OPR O324-RA-97,
Sheet ~~FE-00423~~ 8434.

Format: Longitude in decimal degrees (negative value denotes Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone SEA8			
-134.04478 58.239803	945-2123	0	1.00
-133.929274 58.010814	945-2249	-6	0.96
-133.765896 57.91308	945-2210	0	0.97
-134.080082 57.896614			
-134.132552 57.972586			
-134.272032 58.10242			
-134.183573 58.155284			
-134.15 58.207113			
-134.140172 58.234618			
-134.04478 58.239803			

Final Zoning for OPR O324-RA-97
Stephens Passage, AK



NOAA FORM 76-155
(11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

GEOGRAPHIC NAMES

SURVEY NUMBER

FE-00432

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
ALASKA (title)	X		X							1
CIRCLE POINT	X		X							2
GRAVE POINT	X		X							3
LIMESTONE INLET	X		X							4
SLOCUM INLET	X		X							5
STEPHENS PASSAGE	X		X							6
STEPHENS PASSAGE (title)	X		X							7
STOCKADE POINT	X		X							8
TAKU HARBOR	X		X							9
TAKU HARBOR (ppl)	X		X							10
* ~~LIMESTONE CREEK~~ -	~~X~~		~~X~~							11
										12
										13
* ~~Added after approval~~										14
~~signature.~~										15
										16
										17
										18
										19
					Approved:					20
					Dennis J. Romesburg					21
										22
					Acting Chief					23
					DEC 23 1987					24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 77-27(H) (9-83) | U.S. DEPARTMENT OF COMMERCE | REGISTRY NUMBER

HYDROGRAPHIC SURVEY STATISTICS

F00432

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET	3	SMOOTH OVERLAYS: POS., ARC, EXCESS	NA
DESCRIPTIVE REPORT	1	FIELD SHEETS AND OTHER OVERLAYS	NA

DESCRIPTION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR-GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS	
ACCORDION FILES	1			1		
ENVELOPES						
VOLUMES						
CAHIERS						
BOXES						

SHORELINE DATA

SHORELINE MAPS (List):	DM-10304 and DM-10305
PHOTOBATHYMETRIC MAPS (List):	NA
NOTES TO THE HYDROGRAPHER (List):	NA
SPECIAL REPORTS (List):	NA
NAUTICAL CHARTS (List):	17314 11th Ed., May 25, 1991, 12th Ed., August 1, 1998

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS VERIFICATION	AMOUNTS EVALUATION	AMOUNTS TOTALS
POSITIONS ON SHEET			
POSITIONS REVISED			
SOUNDINGS REVISED			
CONTROL STATIONS REVISED			
	TIME-HOURS VERIFICATION	TIME-HOURS EVALUATION	TIME-HOURS TOTALS
PRE-PROCESSING EXAMINATION	9		9
VERIFICATION OF CONTROL			
VERIFICATION OF POSITIONS			
VERIFICATION OF SOUNDINGS			
VERIFICATION OF JUNCTIONS			
APPLICATION OF PHOTOBATHYMETRY			
SHORELINE APPLICATION/VERIFICATION			
COMPILATION OF SMOOTH SHEET	124.5		124.5
COMPARISON WITH PRIOR SURVEYS AND CHARTS		55	55
EVALUATION OF SIDE SCAN SONAR RECORDS			
EVALUATION OF WIRE DRAGS AND SWEEPS			
EVALUATION REPORT		23	23
GEOGRAPHIC NAMES			
OTHER* (Chart Compilation)		85	85
*USE OTHER SIDE OF FORM FOR REMARKS — TOTALS	141.5	163	304.5

Pre-processing Examination by M. Bigelow	*Beginning Date* 9/17/97	*Ending Date* 9/18/97
Verification of Field Data by M. Bigelow, D. Doles, R. Mayor, L. Deodato	*Time (Hours)* 141.5	*Ending Date* 10/15/99
Verification Check by B. Olmstead	*Time (Hours)* 20	*Ending Date* 11/8/99
Evaluation and Analysis by L. Deodato	*Time (Hours)* 23	*Ending Date* 10/28/99
Inspection by B. Olmstead	*Time (Hours)* 14	*Ending Date* 11/10/99

EVALUATION REPORT

F00432

A. PROJECT

The hydrographer's report contains a complete discussion of the project information.

B. AREA SURVEYED

The survey area is adequately discussed in the hydrographer's report. Depths generally range from 0.2 to 160 fathoms. The bottom consists primarily of sand gravel, and mud.

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) throughout the survey area. Charted features and soundings inshore of this limit line have not been specifically addressed during survey operations and should be retained as charted. A page size plot of the survey area depicting the specific limits of supersession accompanies this report as Attachments A thru C.

C. SURVEY VESSELS

The hydrographer's report contains information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using the same Hydrographic Data Acquisition/Processing System (HDAPS) software used by the hydrographer, the Hydrographic Processing System (HPS), AutoCad (Version 12.0), and MicroStation 95.

Processed digital data for this survey exists in the standard HPS format, that is a database format using the .dbf extension. In addition, the smooth sheet drawing is filed both in the MicroStation drawing format, i.e., .dgn (extension); and in the more universally recognized graphics transfer format, .dxf (extension). Copies of these files have been forwarded to the Hydrographic Surveys Division and a backup copy retained at PHB. Data base records forwarded are in the Internal Data Format(IDF) and are in compliance with specifications in existence at the time of survey processing.

The drawing files necessarily contain information which is not part of the HPS data set such as geographic names text, line-type data, and minor symbolization. In addition, those soundings deleted from the drawing for clarity purposes, remain unrevised in the HPS digital files to preserve the integrity of the original hydrographic data set. Cartographic codes used to describe the digital data are those authorized by Hydrographic Survey Guideline No. 35 and No. 75.

The field sheet parameters have been revised to center the hydrography on the office plot. The data is plotted using a Modified Transverse Mercator projection and are depicted on three 1:10,000 scale sheets.

E. SONAR EQUIPMENT

Refer to section E of the hydrographer's report concerning set-up, operation and processing of side scan sonar data.

F. SOUNDING EQUIPMENT

Sounding equipment has been adequately addressed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

The sounding data have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, dynamic draft, and sound velocity. These reducers have been reviewed and are consistent with NOS specifications.

Predicted tides were used for reduction of soundings during field processing. During office processing, tide reductions were derived from approved hourly heights zoned direct from Juneau, Alaska, gage 945-2210. Taku Harbor, Alaska, gage 945-2123 and Young Bay, Alaska, gage 945-2249 listed on the approved tide note were not used.

H. CONTROL STATIONS

Section H and I of the hydrographer's report contain adequate discussions of horizontal control and hydrographic positioning.

The positions of horizontal control stations used during hydrographic operations are field values based on NAD 83. The geographic positions of all survey data are based on NAD 83. The smooth sheet is annotated with an NAD 27 adjustment tick based on values determined with the NGS program NADCON. Geographic positions based on NAD27 may be plotted on the smooth sheet utilizing the NAD 83 projection by applying the following corrections.

Latitude:	-1.190 seconds	(-36.810 meters)
Longitude:	6.288 seconds	(103.048 meters)

The year of establishment of control stations originate with the horizontal control records for this survey.

I. HYDROGRAPHIC POSITION CONTROL

Differential GPS (DGPS) was used to control this survey. A horizontal dilution of precision (HDOP) not to exceed 3.75 was computed for survey operations. The quality of several positions exceeds limits in terms of horizontal dilution of precision (HDOP). These positions are isolated and occur randomly throughout the survey area. A review of the data, however, suggests that none of these fixes are used to position dangers to navigation. The features or soundings located by these fixes are consistent with the surrounding information. These fixes are considered acceptable. DGPS performance checks were conducted in the field and found adequate.

NAD 83 is used as the horizontal datum for plotting and position computations.

Additional information concerning calibrations and system checks can be found in the hydrographer's report and in the separates related to horizontal position control and corrections to position data.

J. SHORELINE

Shoreline maps DM-10304 and DM-10305, scale 1:20,000, were compiled on NAD 83 and apply to this survey. Shoreline drawn on the smooth sheet originates from the above digital manuscripts as provided in digital format by the Coastal Mapping Program. The digitized files and the survey file were merged during MicroStation processing.

The following features were transferred to the smooth sheet based on "see field sheet" information created in MapInfo by the hydrographer. This information was converted to MicroStation .dgn (extension) and referenced to the survey. The position of these features are approximate.

Feature	Latitude N	Longitude W
rock	58/07/53.87	134/03/53.97
pile	58/04/19.74	134/00/57.09
2 piles	58/04/02.43	134/00/49.78
ruins	58/04/22.00	134/00/44.00

There were no MHW revisions on this survey. However, a floating pier, floats, and a seasonal barge and fish pens not shown on the shoreline maps were located during survey operations. In addition, shoreline discrepancies were noted when comparing the charted and current photogrammetric shorelines. The shoreline shown on the 11th edition of Chart 17314 appears in several cases to have a different orientation and or is offset from the most recent photography. The evaluator suspects the charted Mean High Water Line (MHWL) is from an older source.

K. CROSSLINES

Crosslines are discussed in the hydrographer's report.

L. JUNCTIONS

Survey F00432 junctions with the following surveys.

Survey	Year	Scale	Area
H-10737	1997	1:10,000	Northern Limits (Slocum Inlet)
H-10742	1997	1:20,000	Western Limits (Slocum Inlet)
H-10743	1997	1:40,000	Western Limits (Taku Harbor/Limestone Inlet)

The junctions with surveys H-10742 and H-10743 are complete. A "Joins" note has been added to the smooth sheet. The junction with survey H-10737 was not formally completed since this survey was previously processed and forwarded for charting. Soundings and depth curves are in good agreement. An "Adjoins" note has been added to the smooth sheet.

M. COMPARISON WITH PRIOR SURVEYS

Survey /Year	Scale
H-1897 (1888)	1:80,000
H-1898 (1888)	1:5,000
H-1919 (1888)	1:80,000
H-1920 (1888)	1:80,000
H-1922 (1888)	1:5,000
H-1923 (1888)	1:5,000

The prior surveys listed above cover the entire area of the present surveyed areas. Sounding agreement is good with the present survey depths shoaler between 1 and 2 fathoms. There appears to be consistent pattern of either shoaling or an increase in depths since 1888. Depth

curves and shoreline reveal little or no change since the prior survey work. However, large differences were noted at the following:

Latitude N	Longitude W	Present Survey	Prior Survey
58/03/35.50	134/01/46.00	17.1	44
58/03/43.72	134/01/41.30	22	42
58/03/37.51	134/02/02.93	45	27
58/03/40.63	134/01/56.61	46	19
58/03/45.53	134/01/47.87	42	26
58/07/36.08	134/05/02.81	50	24
58/07/41.93	134/04/57.95	39	15
58/08/13.63	134/04/33.27	109	47
58/08/32.40	134/04/40.99	104	59

These differences may be attributed to greater sounding coverage, improved positioning and sounding methods, relative accuracy of the data acquisition techniques, and prior chart compilation errors. Of note, several of the prior soundings charted in the area north and west of Stockade Point appear to be offset approximately 100 meters east. Comparison with prior survey H-1922 and the present survey reflects adequate agreement after consideration of the datum shift.

The following features were not adequately addressed during the present survey and have been transferred to the smooth sheet.

Feature	Latitude N	Longitude W	Prior Survey
stk M	58/01/19.3	134/00/18.1	H-1897
hrd	58/02/16.6	134/00/51.6	"
rock	58/04/05.2	134/00/43.0	H-1922
rock	58/04/04.5	134/00/44.4	"
8 Fm sdg.	58/04/11.1	134/01/18.4	" (see additional work)
G	58/03/30.9	134/01/57.5	"
S	58/01/50.6	133/59/51.7	H-1923
rky	58/01/47.4	133/59/45.0	"
rky	58/01/39.3	133/59/43.4	"

A rock at latitude 58/04/07.5N, longitude 134/00/40.8W originates from H-1922 and was not transferred to the present survey. It is now located beyond the high water line of the present shoreline manuscript and should be deleted from the chart.

With the transfer of the above features to the present survey, F00432 is adequate to supersede the prior surveys within the common area.

T-3810 (1920) 1:20,000

The following features originate from this prior source and have been transferred to the present survey as listed below.

Feature	Latitude N	Longitude W
subm dol	58/04/16.2	134/00/57.6
subm dol	58/04/07.8	134/00/51.5
subm dol	58/04/06.1	134/00/48.7 (see additional work)
ruins	58/04/13.7	134/00/46.1

ruins 58/04/16.4 134/00/45.1

The oil dock charted at latitude 58/04/06.6N, longitude 134/00/46.9W, originates from T-3810. The dock no longer exists and should be deleted from the chart.

Except as noted above, the present survey, F00432, is adequate to supersede the prior T-sheet within the common area.

N. ITEM INVESTIGATIONS

There were no AWOIS items assigned to this survey.

O. COMPARISON WITH CHART

Survey F00432 was compared with the following chart.

Chart	Edition	Date	Scale	Datum
17314	11th	May 25, 1991	1:20,000	NAD83

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys and miscellaneous source data. The prior surveys have been adequately addressed in section M and require no further discussion. Charted soundings and features originating with miscellaneous source data have been satisfactorily addressed during survey operations except as follows;

The verifier concurs with the hydrographer's note to delete the charted kelp symbols along the shoreline from latitude 58/03/46.00N, longitude 134/03/10.91W to latitude 58/04/14.57N, longitude 134/03/16.31W.

The charted ruins at latitude 58/03/41N, longitude 134/01/18W was not verified by the hydrographer and should be retained as charted.

The anchor symbols that mark the anchorage areas at latitude 58/07/56.56N, longitude 134/04/09.90W and latitude 58/03/58.47N, 134/01/06.73W should be retained as charted.

The application of this survey to charts of a scale greater than 1:40,000 may require the generalization of features such as ledges and reefs. The recommended charting disposition of specific ledges or reefs is their depiction as isolated rocks. The application of this survey to charts of a scale less than 1:40,000 may be accomplished without generalization of features.

With the exceptions noted above, survey F00432 is adequate to supersede charted hydrography within the common area.

b. Dangers to navigation

No dangers to navigation were discovered during survey operations. No additional dangers to navigation were found during office processing.

P. ADEQUACY OF SURVEY

Hydrography contained on survey F00432 is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the required depth curves;

b. reveal there are no significant discrepancies or anomalies requiring further investigation; and

c. show the survey was properly controlled and soundings are correctly plotted.

The hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, April 1994 Edition except as noted in sections M and T of the evaluation report and as follows.

Crosslines were not conducted in accordance with 1.4.2 and 4.3.6 of the Hydrographic Manual. Mainscheme sounding lines shall be supplemented by a series of crosslines for verifying and evaluating the accuracy and reliability of surveyed depths and plotted locations. Crosslines shall be run at angles of 45 to 90 degrees with the regular system of survey lines. A framework of crosslines should be run first as an aid in planning the regular system of lines and to provide a running check on the soundings and positions.

In several instances sounding lines were not conducted in accordance with 4.3.4 of the Hydrographic Manual. Sounding lines must be spaced sufficiently close to permit drawing of accurate depth curves and determine least depths. The following areas are noted as examples for additional sounding line development. See additional work conducted June 13, 1998 (attached).

a).

Depth	Latitude N	Longitude W
10.5	58/02/58	134/01/20
10.4	58/03/57	134/01/13.5
8	58/04/11.1	134/01/18.4

b). The areas at latitude 58/07/51N, longitude 134/04/45W and latitude 58/07/54N, longitude 134/04/30W should have been split to provide better portrayal of the standard depth curves.

c). The two side scan sonar contacts at latitude 58/04/15.3N, longitude 134/01/00.6W and latitude 58/04/04.1N, longitude 134/00/55W were not adequately developed to ensure a least depth. Ten meter line spacing over these areas would have provided better confidence as to the existence or non-existence of submerged obstructions. Both contacts were investigated as part of additional work conducted on June 13, 1998 (attached).

Q. AIDS TO NAVIGATION

One fixed aid to navigation exists within the surveyed areas. It was located and adequately marks the feature intended. There are no floating aids to navigation within the survey area.

Aid to Navigation	Latitude N	Longitude W	Light List No.
Grave Point Light	58/03/43.92	134/03/04.29	23645

There were no features of landmark value either existing and or recommended within the surveyed areas.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS

Miscellaneous information is discussed in the hydrographer's report. No additional miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is a good hydrographic survey. Additional work is recommended to disprove the following; three charted dols located at latitude 58/04/16.2N, longitude 134/00/57.6W; latitude 58/04/07.8N, longitude 134/00/51.5W; and latitude 58/04/06.1N, longitude 134/00/48.7W, the items as mentioned in section N of the hydrographer's report, and those items as noted in sections M and P of the evaluation report. See additional work conducted June 13, 1998 (attached).

U. REFERRAL TO REPORTS

Referral to reports is discussed in the hydrographer's report.

Leonardo T. Deodato
Cartographer

Additional Work Report to Accompany Hydrographic Survey ~~FE-00432~~ F00432

Field Number RA-10-10-97
Scale 1:10,000
February 1999
NOAA Ship RAINIER
Chief of Party: Captain Alan D. Anderson, NOAA

A. PROJECT ✓

This additional work (FE-432-AD WK), for the area of Stephens Passage (FE-432) surveyed in 1997, was completed in Taku Harbor located in Stephens Passage, Alaska. This investigation will provide data to supersede the prior survey soundings and verify charted shoreline features. It will affect Chart 17314, 1:20,000, 11th Edition, 5/25/91 and Chart 17300, 1:209,978, 27th Edition, 8/14/93.

B. AREA SURVEYED. ✓

Additional development was requested to resolve eight items in the area of Taku Harbor. The survey areas are outlined in figure 1.

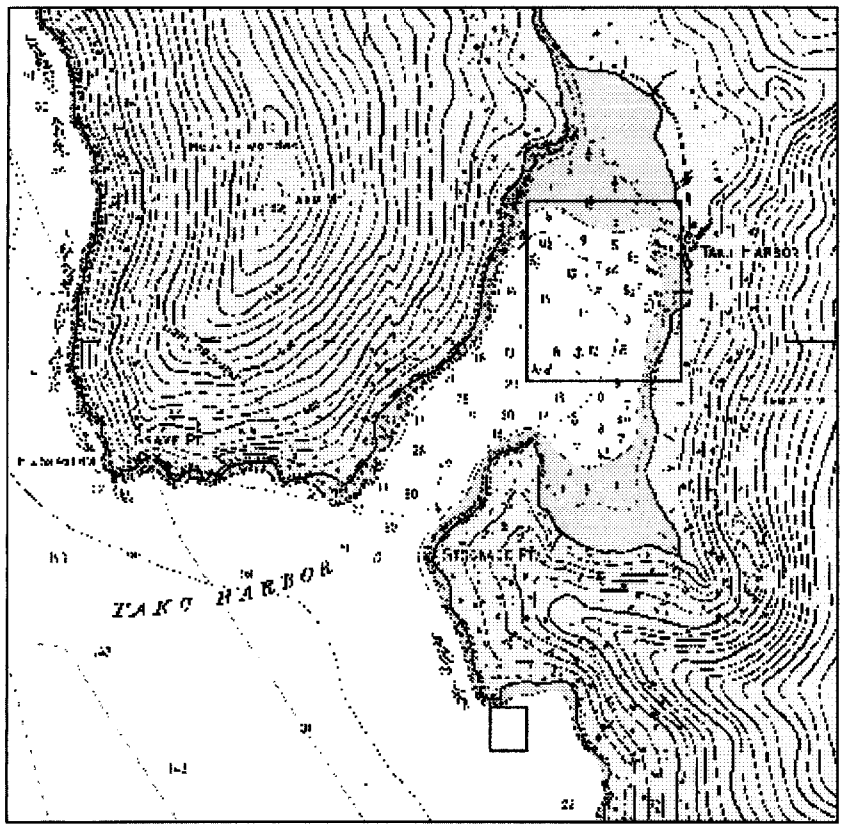


Figure 1. Survey limits shown on a detail of Chart 17314.

Small recreation and fishing vessels were observed trafficking this area. Anchorage's were mainly in the small boat harbor. Data acquisition was conducted on June 13, 1998 (DN 164).

C. SURVEY VESSELS ✓

Data were acquired by RAINIER and the Rainier survey Launches (vessel numbers 2124 and 2125) as noted below:

VN	DN	TYPE of HYDROGRAPHY
2124	164	single-beam developments
2125	164	single-beam developments and side scan sonar

D. AUTOMATED DATA ACQUISITION AND PROCESSING ✓

Single beam echosounder data were acquired using Hypack version 7.1a from Coastal Oceanographics and processed using Hydrographic Processing System (HPS). Raster image and shoreline data in MapInfo facilitated comparisons with the chart and FE-432. Final Detached Positions and soundings based on predicted tides were saved in MapInfo 4.5 format.

E. SONAR EQUIPMENT ✓

Side Scan Sonar (SSS) operations were conducted on this survey to investigate the submerged contacts specified in the additional work requirements. The approximate area of coverage is bound by 58:04:17N, 134:01:22W; 58:04:17N, 134:00:45W; 58:03:59N, 134:00:45W; 58:03:59N, 134:01:22W. The recorder gain setting was adjusted for the best return for changing bottom conditions. A rub test was conducted prior to operating the SSS. The side scan sonogram was manually scanned for significant contacts. An EG&G model 260 slant-range corrected SSS recorder (SN 0011443) and EG&G 272-T-dual channel towfish (SN 016989) were used for acquiring SSS data. The towfish was set on the 100kHz frequency. The towfish was deployed manually on the starboard quarter of RA-5, attached to the aft fall shackle by line and lead around the stern railings. The length of towcable deployed was determined by noting the measured markings on the towfish cable as these markings met the stern railing. The SSS towfish was adjusted to maintain a height off the bottom of 8 to 20 percent of the range scale. The 100-meter range scale was used. SSS operations were conducted at or less than 5 knots.

F. SOUNDING EQUIPMENT ✓

Launch singlebeam echosounder system was used and is described below. The individual system chosen for use in the area was decided at the discretion of the Field Operations Officer.

Launch Singlebeam (VN 2124, 2125): ✓

The singlebeam sounding instruments for this survey were the Raytheon DSF-6000N and Knudsen 320M, which are dual frequency (100 kHz, 24 kHz), digital recording singlebeam fathometers with analog paper traces.* Soundings were acquired in meters using the High + Low, high frequency digitized setting.

* Filed with the hydrographic data.

G. CORRECTIONS TO ECHO SOUNDINGS ✓

Sound Velocity Correctors: ✓

A sound velocity cast was acquired with SBE SEACAT Profiler (S/N 219), calibrated January 27, 1998. Velocity correctors were computed using the PC programs SEACAT and VELOCITY, version 3.1 (1997), in accordance with Field Procedures Manual (FPM) section 2.1.2. and Hydrographic Survey Guideline (HSG) No.69. Sound velocity correctors were applied to the raw sounding data in HPS during post acquisition processing. Printouts of the sound velocity profile, data, and correctors used in field processing are included with this letter.*

Vessel Offset Correctors ✓

The following table shows when the vessel offset correctors used for this survey were last measured:

Vessel No.	Date of static draft and transducer offset measurements	Method of Settlement and Squat Measurement	Date of Settlement and Squat Measurement	Location of Settlement and Squat Measurement
2124	March 26, 1998	Rod leveling	June 11, 1998	Shakan Strait, AK
2125	March 26, 1998	Rod leveling	June 21, 1998	Chilkat Inlet, AK

Settlement and squat correctors were computed in accordance with Hydrographic Manual Section 4.9.4.2, using FPM Fig. 2.4. All offset tables* contain offsets for the GPS antenna, as well as static draft measurements, and settlement and squat data. Offset tables # 1-6 correspond to the last digit of the vessel number and were applied to the raw sounding data in HPS during post-acquisition processing. The launches are not equipped with heave, roll and pitch sensors.

Predicted Tidal Correctors: ✓

The tidal correctors were downloaded from Tides & Currents Pro for Windows, version 2.5b Copyright 1993-1997 by Nautical Software Inc. for the Juneau, Alaska reference station (945-2210). The predicted tides at Juneau were entered into HPS and were applied to soundings without adjusting for zoning. Tidal correctors as provided in the project instructions for FE-00432 are listed below.

Zone Station	Time Corrector (min)	Range Ratio	HPS Tide Table No.
SEA8	000 hr 24 min	x1.03	Table No. 1

Real Tidal Correctors: ✓

The operating tide station at Juneau, AK (945-2210) served as control for datum determination. NOS verified six minute water level heights were used as correctors for this investigation. Data are in meters above MLLW and times are on UTC (GMT). A Next Generation Water Level Measurement System (NGWLMS) Aquatrak is the only sensor at this station. Consequently, RAINIER was not required to inspect or perform leveling of these stations.

A Sutron 8200 Bubbler tide station was established for this project in order to provide information on zoning, tidal datums (reducers), and harmonic constants for predictions. Due to the time limitations of the investigation, the tide gauge was operational for 1.5 days.

* Filed with the hydrographic data.

Refer to the Field Tide Notes, included with this letter, for individual gauge performance and level information. Raw waterlevel data from this gauge has been forwarded to N/CS41 on 11/12/98 in accordance with HSG 50 and FPM 4.7 where it will be processed into final approved (smooth) tides. The Pacific Hydrographic Branch will apply final approved (smooth) tides to the survey data during final processing. A request for delivery of final approved (smooth) tides to the Pacific Hydrographic Branch has been forwarded to N/CS41 in accordance with FPM 4.8. Approved Tide Note dated April 15, 1999 is attached.

H. HYDROGRAPHIC POSITION CONTROL ✓

The horizontal datum for this project is NAD 83. Horizontal control was used to verify and establish local geodetic control for this survey in 1997.

All soundings were positioned using differential GPS (DGPS). The USCG beacon, located at Gustavus, AK, was used for this survey. Concur

I. SHORELINE ✓

The shoreline manuscript from Coastal Mapping Survey CM-8809 was supplied by N/CS341 in Standard Digital Data Exchange Format (SDDEF). The digital files from DM-10304 and DM- 10305 were projected to the survey grid with OPR-O324-RA-97 geodetic parameters using program Shore version 2.0, provided by N/C32.

Shoreline manuscript and field features were compared to an enlargement of Chart 17314 11th Ed. There was general agreement between the charted and manuscript shoreline and what the hydrographer found on this survey. Concur

J. CROSSLINES ✓

Due to the time constraints of this investigation, no crosslines were run. Concur

K. JUNCTIONS ✓

Not Applicable.

L. COMPARISON WITH PRIOR SURVEYS ✓

See Item Investigation Reports.

M. ITEM INVESTIGATIONS ✓

The following is a list of Detached Positions taken on items carried forward from the prior survey or on Contacts found from Side Scan Sonar investigation. See attached item investigation reports for details.

FIX_NUMBER	REMARK (with raw depth in meters)	POSITION Of DP	DEPTH (m) (corrected with predicted tides)	NOTES
50261	Ruins, S end, rng 10m brg 0M (3)m 50261	58-04-12.176 N 134-00-47.976 W	-3.9	Exposed at MHW*
50262	Ruins, N end, rng 10m brg 080M (3)m 50262	58-04-13.885 N 134-00-46.218 W	-3.9	Exposed at MHW*
50263	Ruins, rng 10m brg 020M (2.5)m 50263	58-04-15.326 N 134-00-43.191 W	-3.4	Exposed at MHW*
50264	Ruins, rng 0m brg 0M 0.5m 50264	58-04-21.371 N 134-00-45.601 W	0.2	Exposed at MHW**
40066	Dive #1, sand/mud 15.6m	58-04-04.91 N 134-00-55.352 W	14.7	SSS Target See below***
40068	Dive #2, rocky ridge 16.1m	58-04-3.537 N 134-00-54.78 W	15.2	SSS Target rky***
40070	Dive #3, rocks 9.0m	58-04-15.446 N 134-01-3.316 W	8.2	SSS Target 2.8 Rk***
40071	Dive #4, piling 7.4m	58-04-8.007 N 134-00-47.462 W	7.5	SSS Target 1.8 obstr (pile)

Smooth Sheet

Retained from prior

Retained from prior

Retained from prior

New Feature

* Retained from T-3810(1920)
** Verified 1997 findings
*** 1997 Side Scan Sonar Contacts investigated.

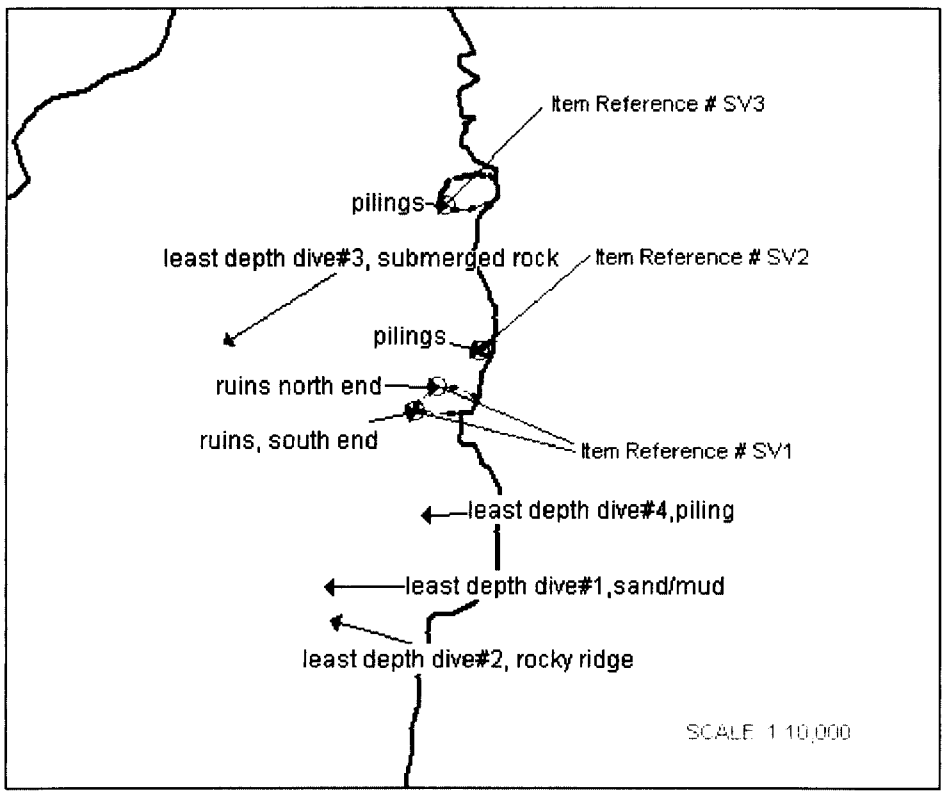


Figure 2. Location of Detached Positions for item investigation

ITEM INVESTIGATION REPORT ✓

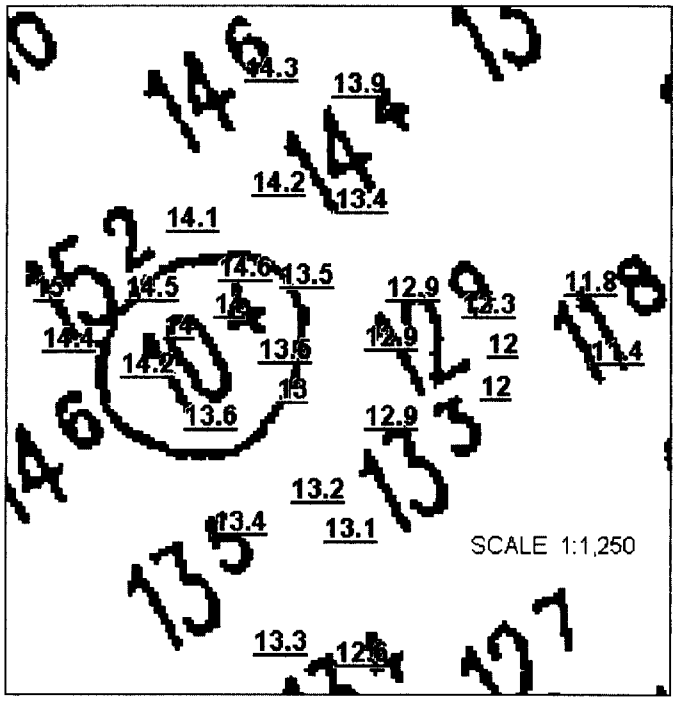
ITEM REFERENCE # : TH104 ✓	**DN:** 164
CHART #:17314 (1:20,000, 11th Edition, 5/91)	**VESNO:** 2124
ITEM DESCRIPTION: Additional development and least depth required for 10.4-fathom sounding at Lat. 58°03'57"N, Long. 134°01'12"W.	
SOURCE: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.	

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	58° 03' 57" N	134° 01' 12" W	
OBSERVED:	58°03'56.630"N ✓	134°01'11.598"W ✓	50113
POSITIONED BY:	DGPS	**DATUM:**	MLLW (NAD 83)
METHOD OF INVESTIGATION: Development lines were ran North-South (7m spacing) on both sides of the item, as well as the lines running East-West with 9-meter spacing, 100% ensonification for low frequency bottom coverage was obtained.			
FINDINGS: There is no evidence that suggests a shoal item with a 10.4-fathom sounding. The shoalest depth acquired in this area was 13-fathoms. Concur (10.4 Fm Sounding was never charted)			

CHARTING RECOMMENDATIONS

Hydrographer recommends charting the area as surveyed. Survey F00432 is the source for the prior* soundings. It is likely that the unsupported and disproved soundings from 1997 ~~were~~ are the result of a school of fish or other biomass that is no longer in the area. Concur Contemporary soundings are in bold red (underlined). Chart this area based on the present survey information. * Do not concur (Survey has not been fully applied to chart)



ITEM INVESTIGATION REPORT ✓

ITEM REFERENCE # : TH8 ✓	**DN:** 164
CHART #:17314 (1:20,000, 11th Edition, 5/91)	**VESNO:** 2124
ITEM DESCRIPTION: 8 fathom sounding (Lat 58-04-11N Long 134-01-18W) in Taku Harbor, AK.	
SOURCE: Pers. Comms. from George Myers, Team Leader, Data Control Group to CDR SamDeBow, Chief Operations Branch, HSD N/CS31.	

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	58° 04' 11" N	134° 01' 18" W	
OBSERVED:	58° 04' 11.460" N	134° 01' 17.839" W ✓	50246
POSITIONED BY:	DGPS	**DATUM:**	MLLW (NAD 83)

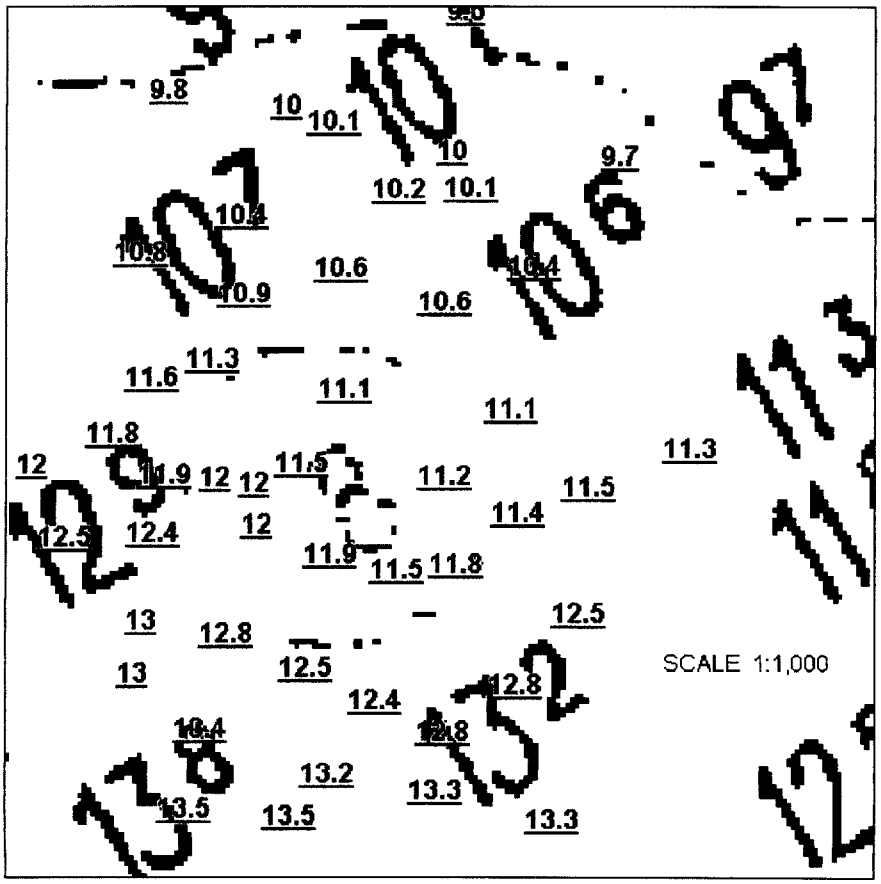
METHOD OF INVESTIGATION: A 60m radius search for the unsupported 8 fathom sounding was conducted using single beam echosounder. Line spacing was within the required specifications to obtain 100% ensonification (low frequency bottom coverage) with the DSF-6000N Echosounder.

FINDINGS: Development of this area verified no 8 fathom sounding. A ~~11.1~~ 10.8 fathom sounding was the shoalest depth found at Lat. 58°04'11.460" N, Long. 134°01'17.839" W. (Based on approved tides)

CHARTING RECOMMENDATIONS

concur

Hydrographer recommends charting the area as surveyed. It is likely that the unsupported and disproved soundings from 1997 ~~were~~ are the result of a school of fish or other biomass that is no longer in the area. Concur
Contemporary soundings in bold red (underlined). Survey F00432 is the source for the ~~prior~~ charted soundings.



ITEM INVESTIGATION REPORT ✓

ITEM REFERENCE # : TH105 ✓	**DN:** 164
CHART #:17314 (1:20,000, 11th Edition, 5/91)	**VESNO:** 2124
ITEM DESCRIPTION: Unsupported 10.5-fathom sounding at Lat. 58°02'58"N, Long. 134°01'22"W.	
SOURCE: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.	

GEOGRAPHIC POSITION

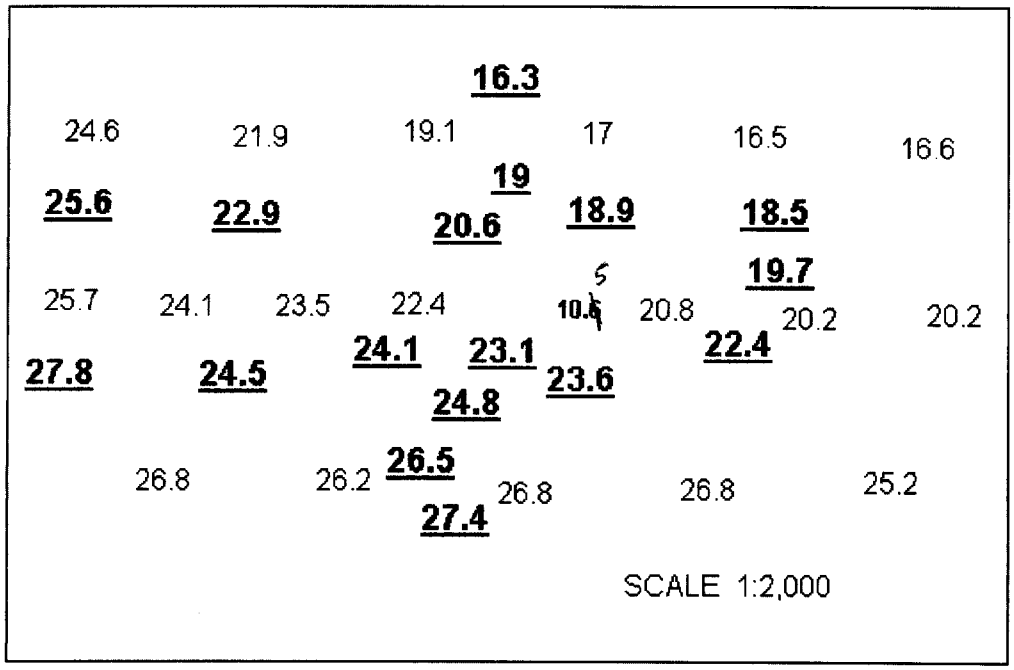
	LATITUDE	LONGITUDE	POSITION #
CHARTED:	58° 02' 58" N	134° 01' 22" W	
OBSERVED:	58°02'58.797"N	134°01'19.659"W ✓	40038
POSITIONED BY:	DGPS	**DATUM:**	MLLW (NAD 83)
METHOD OF INVESTIGATION: The area was developed using 10-meter spacing which was the required line spacing for 100% ensonification (low frequency bottom coverage).			
FINDINGS: The 1997 and 1998 soundings agree well. The Knudsen 320M Marine Echosounder low frequency bottom coverage at that depth showed no 10.5 fathom shoal in that area. Concur			

10.5 Fm Sounding was never charted.

CHARTING RECOMMENDATIONS

Concur

Hydrographer recommends charting the area as surveyed. It is likely that the unsupported and disproved 10.5 fathom sounding from 1997 was the result of a school of fish or other biomass that is no longer present in this area. Soundings in bold red (underlined) are from the contemporary investigation. Black soundings are from the 1997 survey. Concur



ITEM INVESTIGATION REPORT

ITEM REFERENCE # : TH05	**DN:** 164
CHART #:17314 (1:20,000, 11th Edition, 5/91)	**VESNO:** 2124
ITEM DESCRIPTION: Possible sunken rock (0.5-fathom sounding) at Lat. 58°03'07"N, Long. 134°01'22"W.	
SOURCE: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.	

GEOGRAPHIC POSITION

	LATITUDE	LONGITUDE	POSITION #
CHARTED:	58° 03' 07"N	134° 01' 22"W	
OBSERVED:	58° 03'05.924"N	134° 01'22.823"W	40059
POSITIONED BY:	DGPS	**DATUM:**	MLLW (NAD 83)

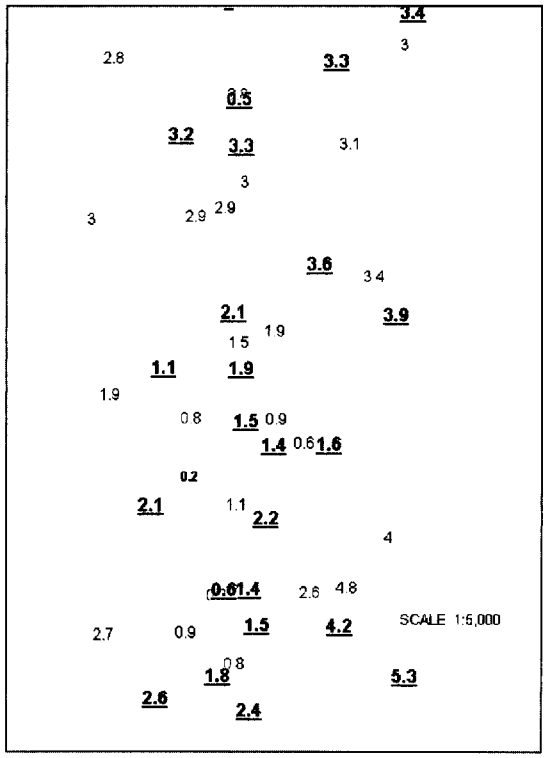
METHOD OF INVESTIGATION: The area was investigated using singlebeam echosounder. Line spacing was within the required specifications to obtain 100% ensonification (low frequency bottom coverage) with the DSF-6000N Echosounder.

FINDINGS: Development using singlebeam echosounder provides evidence to support the charted shoal sounding. The soundings from 1997 and 1998 are in good agreement. A 0.5 fathom sounding was obtained 50 meters north of the ~~prior~~ surveyed 1997 sounding. Kelp distribution suggests that the object is a sunken rock. Shown as 05 Rk on smooth sheet. 05 Rk is shown on smooth sheet from 1997 survey work.

* Excessed for plotted 05 Rk

CHARTING RECOMMENDATION

Hydrographer recommends that the least depths be chosen from a combination of the 1997 and 1998 data. concur
The surveys agree and together they define this shoal quite well. Soundings in bold red (underlined) are from the contemporary investigation. Black soundings are from the 1997 survey.



TAKU HARBOR, AK INVESTIGATIONS

Item Reference Number: SV1
Item Description: Verification of Ruins
Source: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.
Estimated Position: 58°04'14"N 134°00'46"W
Charts Affected: 17314, 17300

Investigation

Date (s)/DN (s): 13 June 1998 / DN 164

Position Numbers: 50261, 50262

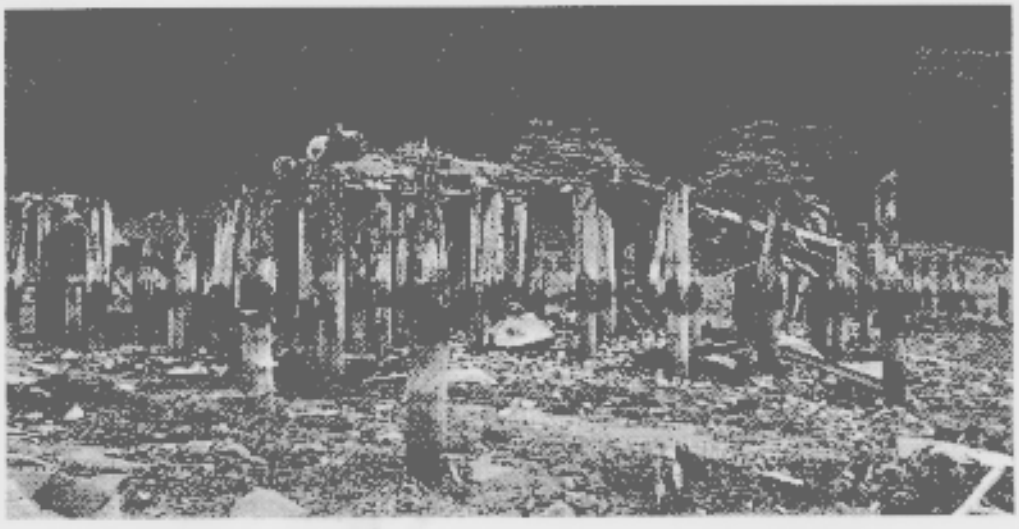
Position Determined by: DGPS

Investigation Summary: Investigated using visual reconnaissance and photographed with a digital camera (see photo below). Ruins were found as charted. The detached positions were taken by positioning the launch (bearing 000M and 080M respectively) as close as possible (10m) to the ruins. D.P.#50261 is the Southwestern-most edge of the ruins. D.P.#50262 is the Northwestern-most edge of the ruins. The approximate area of the ruins is 100mx30m. In addition, a handheld GPS receiver was used by a shore party to repetitively check the position, however, the differences between the D.P. and hand-held GPS varied. This may be because of 1) the accuracy of the handheld GPS and 2) the large area of the ruins.

Method	Depth (m)	Fix#	Latitude (N)	Longitude (W)
DP	-3.0	50261	58°04'12.176"N	134°00'47.976"W
Hand-held GPS	---	---	58°04'11"N	134°00'44"W
DP	-3.0	50262	58°04'13.885"N	134°00'46.218"W
Hand-held GPS	---	---	58°04'13"N	134°00'48"W

Charting Recommendation

Hydrographer verifies this item carried forward from the prior survey and recommends retaining as charted. The digital image was taken facing East.



TAKU HARBOR, AK INVESTIGATIONS

Item Reference Number: SV2
Item Description: Verification of Ruins
Source: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.
Estimated Position: 58°04'16"N 134°00'45"W
Charts Affected: 17314, 17300

Investigation

Date (s)/DN (s): 13 June 1998 / DN 164

Position Number: 50263

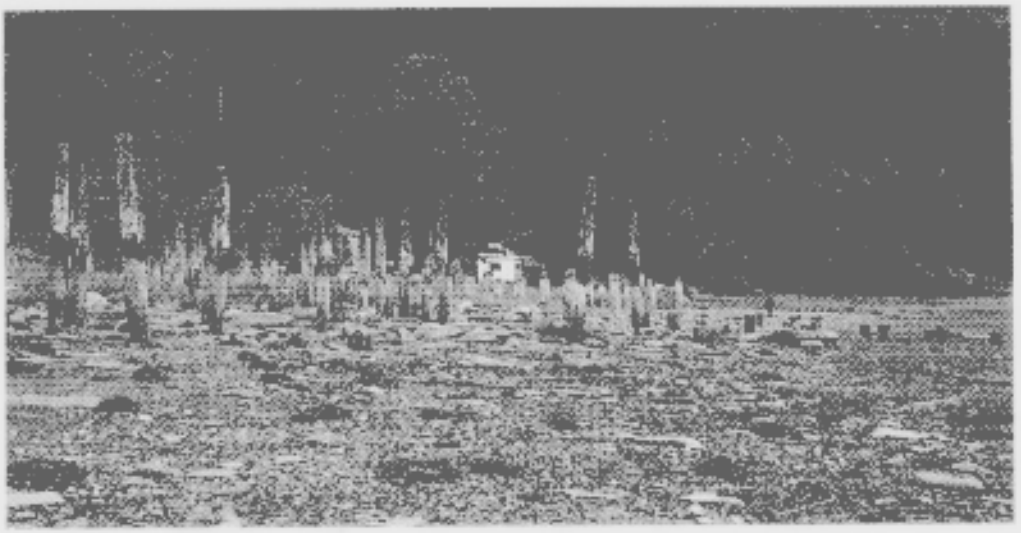
Position Determined by: DGPS

Investigation Summary: Investigated using visual reconnaissance and photographed with a digital camera (see photo below). Ruins were found as charted. The detached position was taken by positioning the launch (bearing 020 M) as close as possible (10m) to the ruins. The approximate area of the ruins is 15mx5m. In addition, a handheld GPS receiver was used by a shore party to repetitively check the position.

Method	Depth (m)	Fix#	Latitude (N)	Longitude (W)
DP	-2.5	50263	58°04'15.326"N	134°00'43.191"W
Hand-held GPS	---	---	58°04'16"N	134°00'41"W

Charting Recommendation

Hydrographer verifies this item carried forward from the prior survey but recommends charting as pilings. The digital image was taken facing Southeast. *Retained as charted.* Do not contour



TAKU HARBOR, AK INVESTIGATIONS

Item Reference Number: SV3
Item Description: Verification of Ruins
Source: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.
Estimated Position: 58°04'22"N 134°00'45"W
Charts Affected: 17314, 17300

Investigation

Date (s)/DN (s): 13 June 1998 / DN 164

Position Number: 50264

Position Determined by: DGPS

Investigation Summary: Investigated using visual reconnaissance and photographed with a digital camera (see photo below). Ruins were found as charted. The detached position was taken by positioning the launch onto the ruins (bearing 0 mag, 0m range) at high tide. The approximate area of the ruins is 7mx3m. In addition, a handheld GPS receiver was used by a shore party to repetitively check the position.

Method	Depth (m)	Fix#	Latitude (N)	Longitude (W)
DP	0.5	50264	58°04'21.371"N	134°00'45.601"W
Hand-held GPS	---	---	58°04'21"N	134°00'45"W

Charting Recommendation

Hydrographer verifies this item ~~carried forward~~ as found from ~~prior~~ 1997 survey but recommends charting as pilings. The digital image was taken facing Northeast. Concur with Classification Chart ruins

TAKU HARBOR, AK INVESTIGATIONS

Item Reference Number: SV4
Item Description: Pile
Source: Additional work requirements given by CDR Sam DeBow, Chief Operations Branch, HSD, N/CS31 per George Myers, Team Leader, Data Control Group for the area of Taku Harbor, Alaska (FE-432) surveyed in 1997.
Hand-held GPS Position: 58°04'20.00"N 134°00'55.00"
Charts Affected: 17314, 17300

Investigation

Date (s)/DN (s): 13 June 1998 / DN 164

Charted Position: 58°04'20"N 134°00'49"W

Position Determined by: handheld GPS

Investigation Summary: Investigated using visual reconnaissance and photographed with a digital camera. A wooden pile, approximately 2m high and 0.5m diameter was found as charted. The digital image was taken facing Northeast at a distance of 3m. A hand-held GPS receiver was the only instrument used to position this item. The non-differential corrected GPS position of this pile is Lat. 58-04-20N, Long. 134-00-55W, which is 100m ~~West~~ North of the charted position. Note that hand-held GPS receiver may have precision of 30 to 100m. No other obstruction was observed within a 100m radius of this item.

Charting Recommendations

DOLPHIN MCR 12/7/99

This pile is submerged at high tide and is a significant feature. Hydrographer recommends retaining the pile as charted. Do not concur. ~~This is not the charted pile. This is the pile portrayed on the smooth sheet as found in 1997. The charted pile originates from T-3810 (1920) and has been transferred in color to the smooth sheet.~~ dolphin

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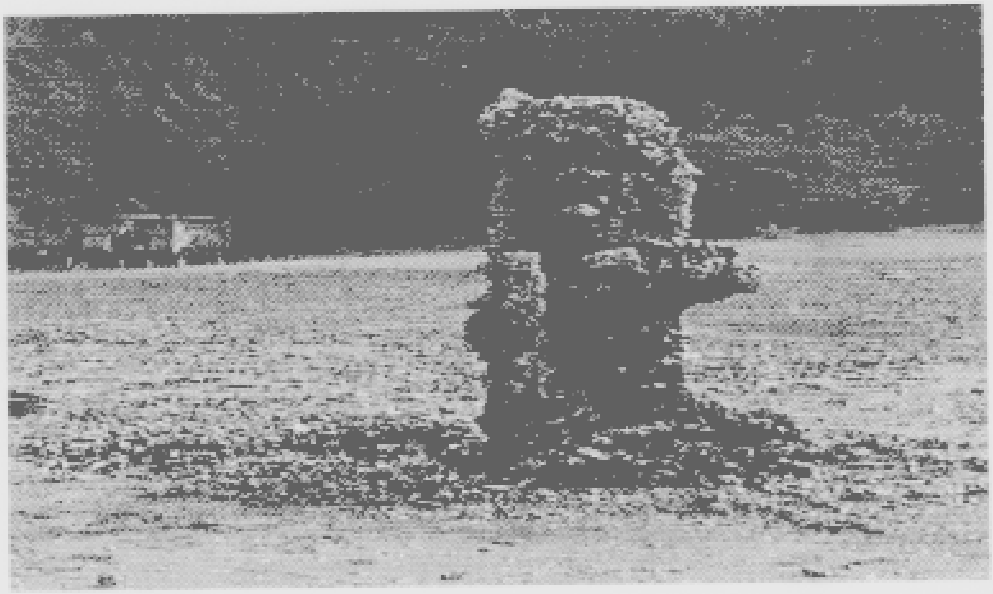


N. COMPARISON WITH THE CHART ✓

See Item Investigation Reports.

O. ADEQUACY OF SURVEY ✓ See Add. Eval Rpt., section P.

Survey FE 432 AD WK is complete and adequate to verify or supersede prior soundings and features as noted in the individual Item Investigation Reports. Do not concur

P. AIDS TO NAVIGATION ✓

Not Applicable.

Q. STATISTICS ✓

Refer to the Survey Information Summary attached to this report.

R. MISCELLANEOUS ✓

None

S. RECOMMENDATIONS ✓

None

T. REFERRAL TO REPORTS ✓

The following supplemental reports contain additional information relevant to this survey:

Title	Date Sent	Office
Project related data for OPR-0340-RA	Incremental	N/CS34

Respectfully Submitted,

Paul J. McAnally
Senior Survey Technician

Approved and Forwarded,

Alan D. Anderson
Captain, NOAA
Commanding Officer

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: April 15, 1999

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR-0324-RA
HYDROGRAPHIC SHEET: F00432

LOCALITY: Taku Harbor, Stephens Passage, AK.

TIME PERIOD: June 13, 1998

TIDE STATION USED: 945-2210 Juneau, AK.
Lat. 58° 17.9'N Lon. 134° 24.7'W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.674 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SEA8
Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (Meters), relative to MLLW and on Greenwich Mean Time.

Note 2:
Juneau, AK (945-2210) was used as the control for datum determination for all subordinate tide stations for this survey. Relative sea level trends show that the areas of Juneau AK are undergoing continual uplift. The relative sea level trend observed at Juneau for the time period 1950 through 1993 is -0.0114 m/yr. with a standard error of 0.0005 m/yr. Due to a high rate of sea level change, the 1960 to 1978 Tidal Epoch value of Mean Lower Low Water (MLLW) used as chart datum and reference datum for NOS tidal predictions does not reflect present conditions. The data are under review to determine an updated value of MLLW. An interim value was computed for Juneau based on the series of data from 1989 to 1991 and controlled by the 1960-1978 Epoch datums at Ketchikan which is more stable. The provided values adjust the chart datum to a more realistic level and in a direction that is more conservative for navigation purposes.

Note 3: A tide gauge was installed at Taku Harbor (945-2123), however, it was operated for less than the 3 day minimum time requirement and the time series did not completely bracket the time of hydrographic surveying. The data from Taku Harbor were used to validate that the data from Juneau (945-2210) are within the specified tolerance error for hydrographic surveying. Therefore, only the data from Juneau (945-2210) are included for tide reduction of the 1998 survey in Taku Harbor.

For ----------

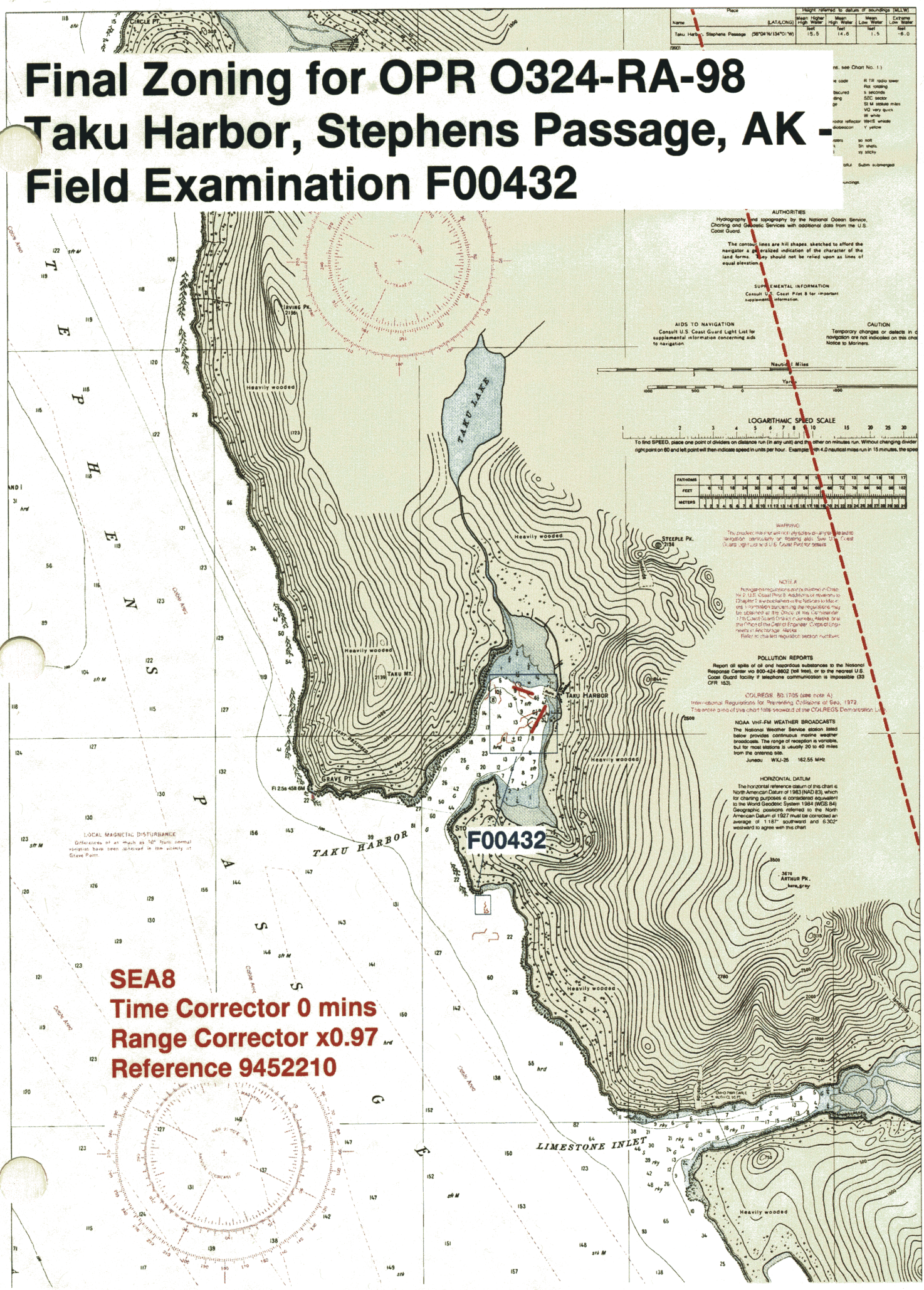
CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION

Final tide zone node point locations for OPR O324-RA-98,
Field Examination F00432.

Format: Longitude in decimal degrees (negative value denotes Longitude West),
Latitude in decimal degrees
Tide Station (in recommended order of use)
Average Time Correction (in minutes)
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone SEA8			
-134.04478 58.239803	945-2210	0	0.97
-133.929274 58.010814			
-133.765896 57.91308			
-134.080082 57.896614			
-134.132552 57.972586			
-134.272032 58.10242			
-134.183573 58.155284			
-134.15 58.207113			
-134.140172 58.234618			
-134.04478 58.239803			

Final Zoning for OPR O324-RA-98 Taku Harbor, Stephens Passage, AK - Field Examination F00432



Survey Information Summary

Project: OPR-A999-98 **Project Name:** TAKU HARBOR

Instructions Dated: 5/19/98 **Project Change Info:**

Sheet Letter: FE **Registry Number:** F00432

Sheet Number: RA-10-~~11-98~~ 10-97

Survey Title: Slocum and Limestone Inlets and Taku Harbor

Data Acquisition Dates: **From:** 13-Jun-98 164 **To:** ~~06-Sep-98~~ 13 Jun 98 164

Vessel Usage Summary

VESNO	MS	SPLITS	DEV	XL	S/L	DP	BS	DIVE
2124			2			1		
2125			1			1		

Sound Velocity Cast Information

Launch Table #	Ship Table #	Cast DN	Max Depth	Position	Applicable DN
1		166	374.1	58/48/24	164
				135/09/36	

Tide Zone Information

Zone #	Time Corr.	Height Corr.
SEA8	000 hr 24 min	1.03

Tide Gage Information

Tide Gage #	Gage Name	Installed	Removed
945-2123	TAKU HARBOR,AK	6/12/98	6/13/98

Statistics Summary

Type	Total:
DEV	4.25
DP	0

Percent XL:	
SQNM:	0

APPROVAL SHEET

for

F00432
~~FE-432~~-AD WK

Standard field surveying and processing procedures were followed in producing this examination in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1998.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

DATE: JUNE 20, 1999

Approved and Forwarded,

Alan D. Anderson

Alan D. Anderson
Captain, NOAA
Commanding Officer
NOAA Ship RAINIER

ADDENDUM TO EVALUATION REPORT

F00432

A. PROJECT

This additional field work was initiated following a review of survey results from the 1997 season. That review disclosed several deficiencies, which required additional work to resolve. The evaluation report for the previous survey contains further information on the specific nature of the deficiencies while the hydrographer's report details the additional work conducted to resolve them.

B. AREA SURVEYED

The survey area is graphically depicted in Figure 1 of the hydrographer's report, section B. The evaluation report for the 1997 survey work contains additional information regarding the area surveyed.

C. SURVEY VESSELS

The hydrographer's report contains information relating to survey vessels.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data were processed using HYPACK, the same Hydrographic Processing System, and MicroStation 95.

The evaluation report for the 1997 survey work contains additional information regarding automated data acquisition and processing.

E. SONAR EQUIPMENT

Side scan sonar was used on DN 164 for investigation purposes only. Refer to section E of the hydrographer's report concerning set-up, operation and processing of side scan sonar data.

F. SOUNDING EQUIPMENT

Sounding equipment has been adequately addressed in the hydrographer's report.

G. CORRECTIONS TO SOUNDINGS

Soundings and elevations below Mean High Water (MHW) have been reduced to Mean Lower Low Water (MLLW). The reducers include corrections for an actual tide, static draft, dynamic draft (settlement and squat), and sound velocity. These reducers have been reviewed and are consistent with NOS specifications.

Predicted tides were used for reduction of soundings during field processing. During office processing, soundings and elevations have been reduced to Mean Lower Low Water (MLLW) or Mean High Water (MHW) as appropriate with verified tide correctors obtained from the Center for Operational Oceanographic Products and Services (CO-OPS). The correctors are zoned direct from tide gage, Juneau, Alaska, gage 945-2210.

H. CONTROL STATIONS

Section H of the hydrographer's report contains an adequate discussion of horizontal control and hydrographic positioning. Additional information is found in the evaluation report for the 1997 survey work.

I. HYDROGRAPHIC POSITION CONTROL

Information relating to hydrographic position control is found in the evaluation report for the 1997 survey work and the hydrographer's report, section H.

J. SHORELINE

Information relating to shoreline is found in the evaluation report for the 1997 survey work.

K. CROSSLINES

There were no crosslines conducted during the additional work.

L. JUNCTIONS

Reference the evaluation report for the 1997 survey work.

M. COMPARISON WITH PRIOR SURVEYS

The following feature originate from T-3810 (1920) and have been transferred in color to the present survey as submerged and is listed below. This item was not investigated and or discussed during the 1997 survey and/or the 1998 additional work.

Feature	Latitude N	Longitude W
subm dol	58/04/07.8	134/00/51.5

With the exception of the item listed above, and those items listed in the evaluation report for 1997, F00432 is adequate to supersede prior survey data within the common area. The evaluation report for the 1997 survey work contains additional information regarding prior survey comparisons.

N. ITEM INVESTIGATIONS

Item investigations were adequately discussed in the hydrographer's report.

O. COMPARISON WITH CHART

Survey F00432 was compared with the following chart.

Chart	Edition	Date	Scale	Datum
17314	12th	August 1, 1998	1:20,000	NAD83

a. Hydrography

Charted hydrography originates with the previously discussed prior surveys in the 1997 evaluation report and the latest photogrammetric shoreline maps compiled to the 12th edition.

The prior surveys have been adequately addressed in the hydrographer's/evaluation reports for 1997-98 and require no further discussion.

Charted items to be retained are listed in the evaluation reports, sections M and O, for 1997-98. With these exceptions, F00432 is adequate to supersede charted data within the common area.

b. Dangers to navigation

No dangers to navigation were discovered during survey operations. No additional dangers to navigation were found during office processing.

P. ADEQUACY OF SURVEY

Hydrography contained on survey F00432 is adequate to:

a. delineate the bottom configuration, determine least depths, and draw the required depth curves;

b. reveal there are no significant discrepancies or anomalies requiring further investigation; and

c. show the survey was properly controlled and soundings are correctly plotted.

With the exceptions of those items noted below, the hydrographic records and reports received for processing are adequate and conform to the requirements of the Hydrographic Manual, 4th Edition, revised through Change No. 3, the Hydrographic Survey Guidelines, and the Field Procedures Manual, April 1998 Edition.

The survey information summary reflects that the sound velocity cast was taken on day 166 and approximately 60 nautical miles north of Taku Harbor. A velocity cast in Taku Harbor may have provided more accurate velocity correctors for the specific water column in the survey area.

Crosslines were not conducted in accordance with the additional work requirements for Taku Inlet.

The submerged dol listed for additional work and mentioned in section M was not investigated.

Q. AIDS TO NAVIGATION

Reference the evaluation report for the 1997 survey work.

R. STATISTICS

Statistics are itemized in the hydrographer's report.

S. MISCELLANEOUS

No miscellaneous information is discussed in the hydrographer's report. No miscellaneous items were noted during office processing.

T. RECOMMENDATIONS

This is an adequate hydrographic survey. Additional items warranting further work are listed in the evaluation report, sections M and P.

U. REFERRAL TO REPORTS

Referral to reports is discussed in the hydrographer's report.

Leonardo T. Deodato
Cartographer

APPROVAL SHEET
F00432

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, comparison with prior surveys and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Dennis Hill Date: 3-30-00
Dennis Hill
Chief, Cartographic Team
Pacific Hydrographic Branch

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

James C. Gardner Date: 3-30-00
James C. Gardner
Commander, NOAA
Chief, Pacific Hydrographic Branch

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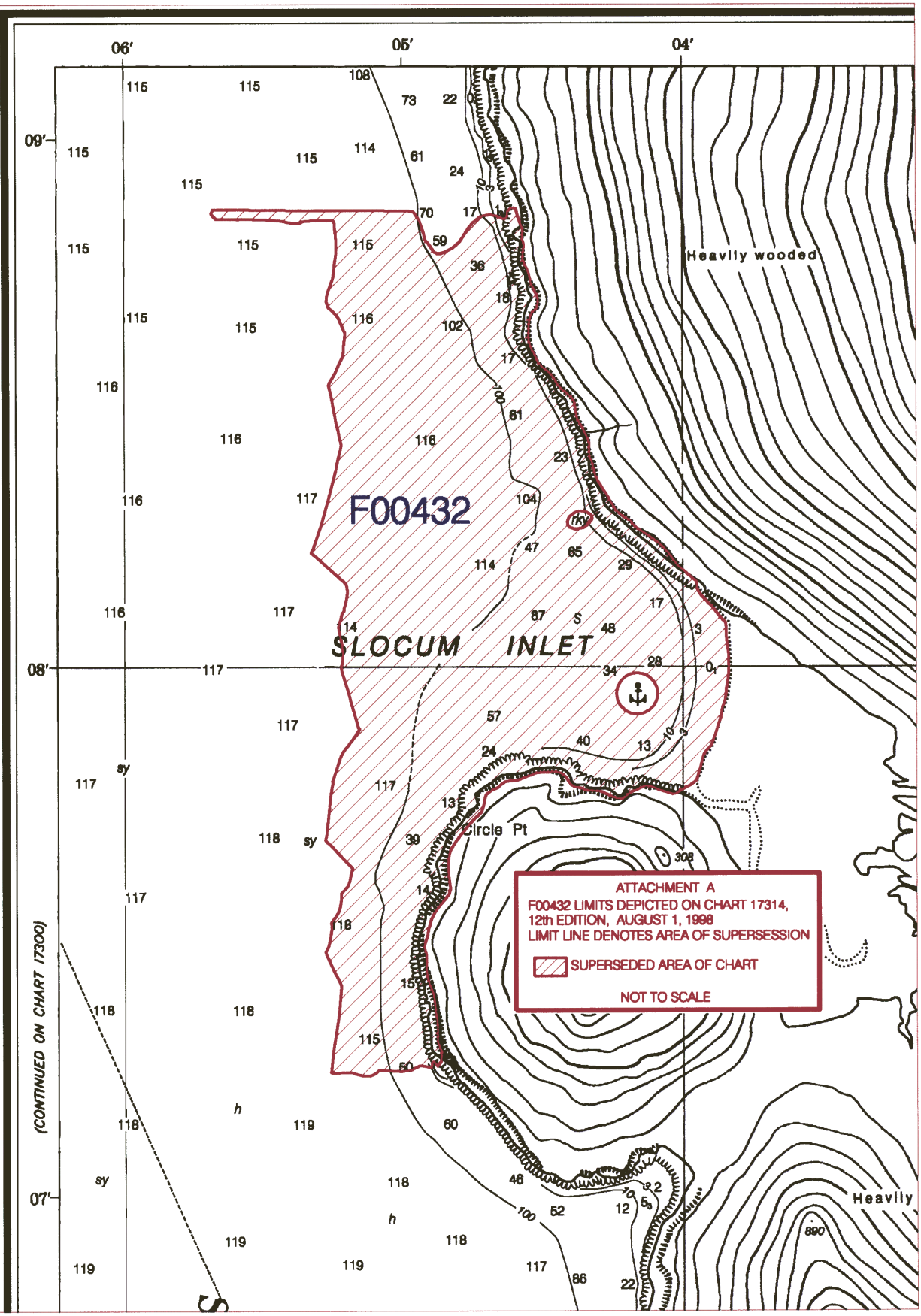
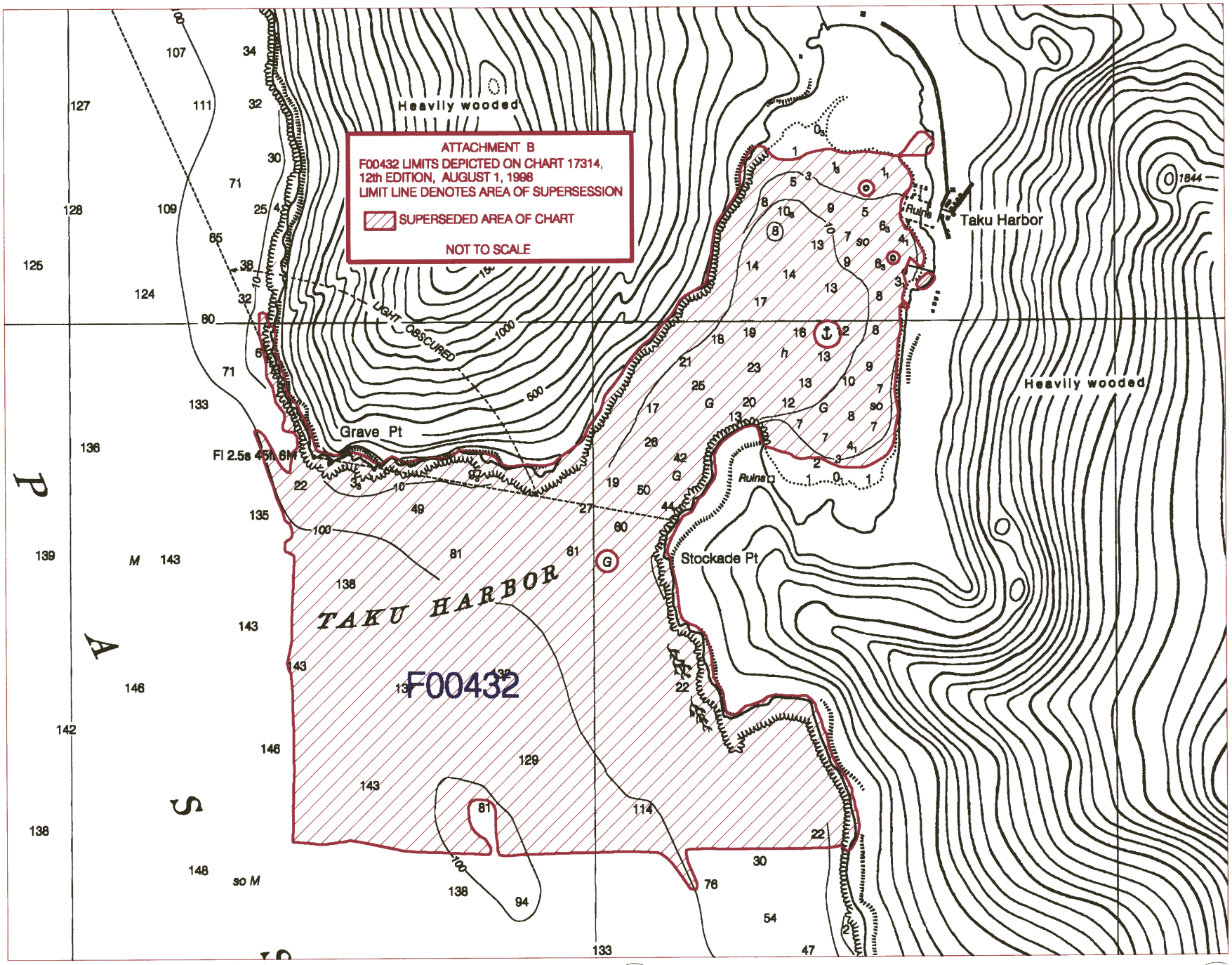
Final Approval

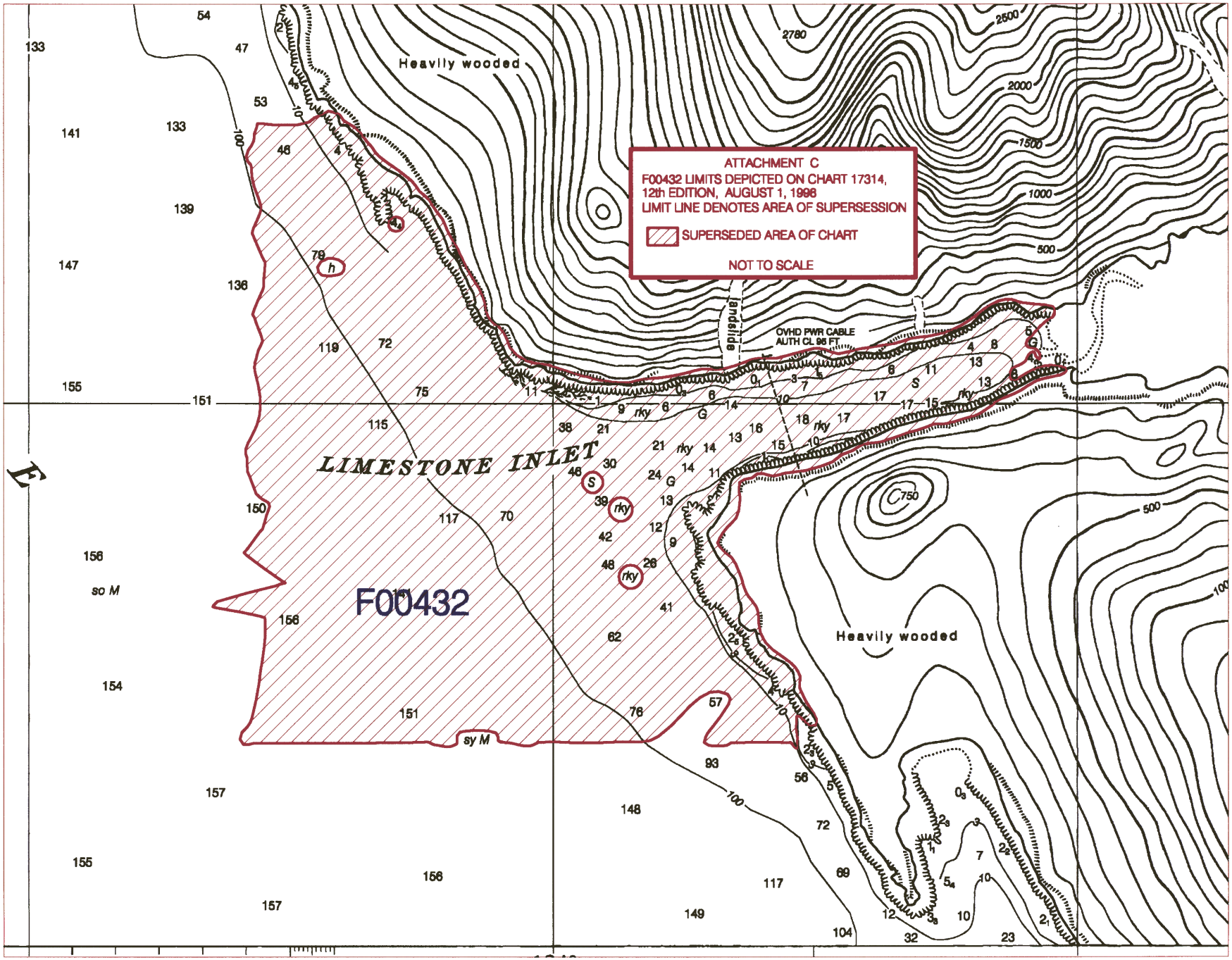
Approved:

Samuel P. De Bow, Jr. Date: May 1, 2000
Samuel P. De Bow, Jr.
Captain, NOAA
Chief, Hydrographic Surveys Division

17314


06′
05′
04′
09′
08′
07′
F00432
SLOCUM INLET
Circle Pt
Heavily wooded
Heavily
(CONTINUED ON CHART 17300)
ATTACHMENT A
F00432 LIMITS DEPICTED ON CHART 17314,
12th EDITION, AUGUST 1, 1998
LIMIT LINE DENOTES AREA OF SUPERSESSION
SUPERSEDED AREA OF CHART
NOT TO SCALE


ATTACHMENT B
F00432 LIMITS DEPICTED ON CHART 17314,
12th EDITION, AUGUST 1, 1998
LIMIT LINE DENOTES AREA OF SUPERSESSION
SUPERSEDED AREA OF CHART
NOT TO SCALE
Heavily wooded
Taku Harbor
Heavily wooded
Grave Pt
Fl 2.5s 45ft 6M
Stockade Pt
TAKU HARBOR
F00432
Ruins
Ruins
LIGHT OBSCURED
1844


ATTACHMENT C
F00432 LIMITS DEPICTED ON CHART 17314,
12th EDITION, AUGUST 1, 1998
LIMIT LINE DENOTES AREA OF SUPERSESSION
SUPERSEDED AREA OF CHART
NOT TO SCALE
F00432
LIMESTONE INLET
Heavily wooded
Heavily wooded
landslide
OVHD PWR CABLE
AUTH CL 98 FT
E

134° 05'30" 134° 05'00" 134° 04'30" 134° 04'00" 134° 03'30"

58° 09'00"

58° 08'30"

58° 08'00"

58° 07'30"

134°04'00"W
NAD 27
58°09'00"N

ADJOINS H-10737 (1997)

JOINS H-10742 (1997)

STEPHENS PASSAGE

SLOCUM INLET

CIRCLE POINT

gravel beach

gravel beach

gravel and mud bar

gravel beach

CONTROL STATIONS

001 GUSTAVUS
003 TWIN
004 MIDWAY

Stations are located beyond sheet limits

Feature elevations in feet

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

F00432
ALASKA, STEPHENS PASSAGE
SLOCUM AND LIMESTONE INLETS AND TAKU HARBOR
FIELD SHEET: RA-10-10-97
DATE OF SURVEY: APRIL 22-JUNE 19, 1997
SOUNDINGS IN FATHOMS
DATUM: NAD 83
PROJECTION: MTM
CENTRAL MERIDIAN: 133°54'00"W
SCALE 1:10,000 SCALE FACTOR: 0.99998

SHEET 1 OF 3

58° 04'00"

134° 02'30"W
NAD 27
58° 04'00"N

gravel beach

pile

ruins

ruins

Features in violet from T-3810 (1920)

subm dol

18 obstr (pile)

floating pier

Tide Station

TAKU HARBOR

4 piles

58° 04'00"

boulder beach

Features in red from H-1922 (1888)

GRAVE POINT

Grave Point Light

gravel beach

foul

CONTROL STATIONS
001 GUSTAVUS
003 TWIN
004 MIDWAY

Stations are located beyond sheet limits

Feature elevations in feet

STOCKADE POINT

58° 03'30"

TAKU HARBOR

STEPHENS PASSAGE

JOINS H-10743 (1997)

03'00"

58° 03'00"

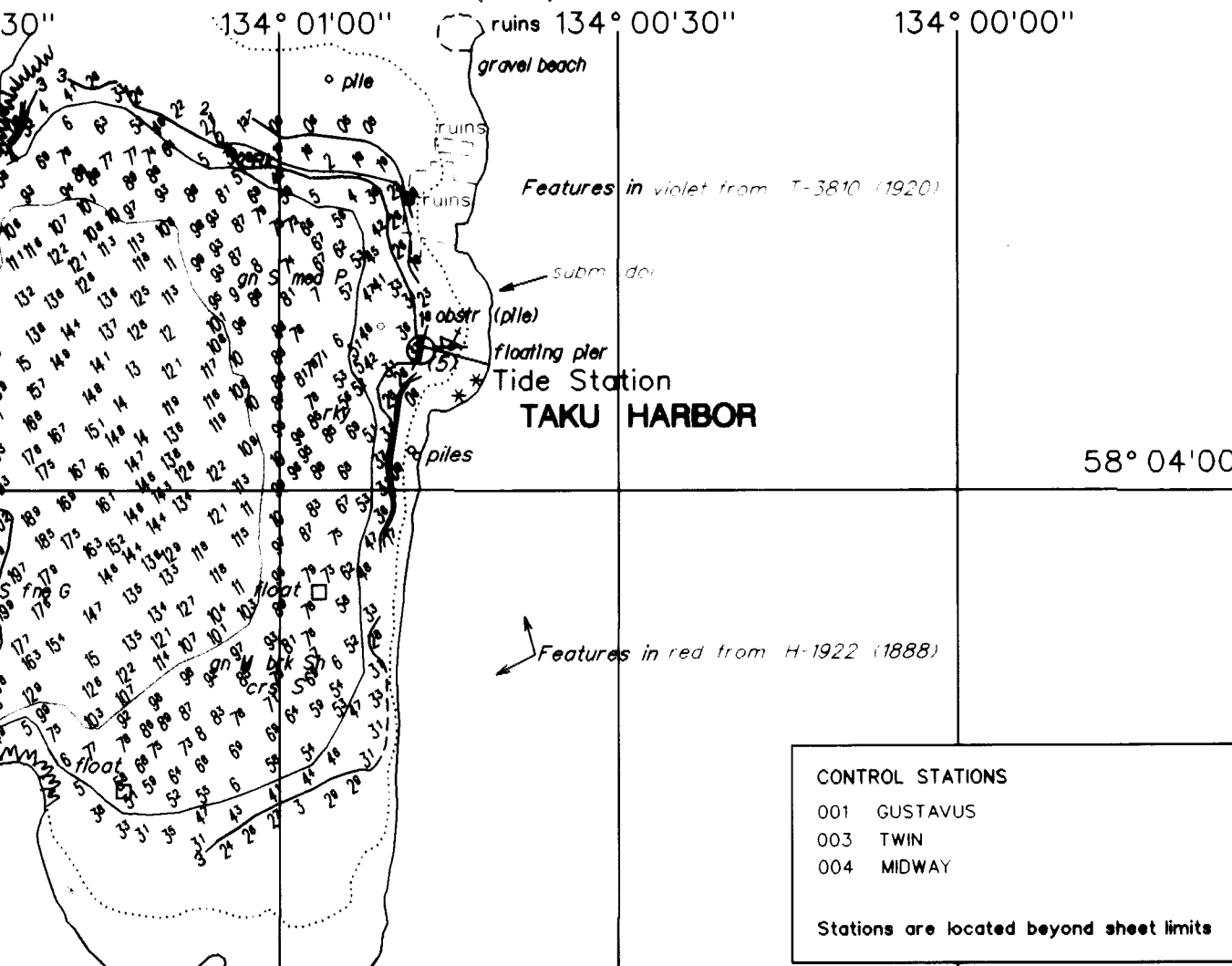
134° 03'00" 134° 02'30" 134° 02'00" 134° 01'30" 134° 01'00" 134° 00'30" 134° 00'00"

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

F00432
ALASKA, STEPHENS PASSAGE
SLOCUM AND LIMESTONE INLETS AND TAKU HARBOR
FIELD SHEET: RA-10-10-97
DATE OF SURVEY: APRIL 22-JUNE 19, 1997, JUNE 13, 1998
SOUNDINGS IN FATHOMS
DATUM: NAD 83
PROJECTION: MTM
CENTRAL MERIDIAN:133°54'00"W
SCALE 1:10,000 SCALE FACTOR: 0.99998

SHEET 2 OF 3

ON ORIGINAL DOCUMENT
NOT ON PAGE 59 SCAN



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

F00432
ALASKA, STEPHENS PASSAGE
SLOCUM AND LIMESTONE INLETS AND TAKU HARBOR
FIELD SHEET: RA-10-10-97
DATE OF SURVEY: APRIL 22-JUNE 19, 1997
SOUNDINGS IN FATHOMS
DATUM: NAD 83
PROJECTION: MTM
CENTRAL MERIDIAN: 133°54'00"W
SCALE 1:10,000 SCALE FACTOR: 0.99998

SHEET 3 OF 3

CONTROL STATIONS
001 GUSTAVUS
003 TWIN
004 MIDWAY

Stations are located beyond sheet limits

Barge and fish pen are seasonal (March 15 - May 30)

OVHD PWR CABLE

float

barge

fish pens

Mooring buoys (priv maintd)

OVHD PWR CABLE

Bottom characteristics in red from H-1923

Bottom characteristics in violet from H 1897

JOINS H-10743 (1997)

LIMESTONE INLET

STEPHENS PASSAGE

133°58'30"W
NAD 27
58°01'30"N

58°02'30"
58°02'00"
58°01'30"
134°01'30"
134°01'00"
134°00'30"
134°00'00"
133°59'30"
133°59'00"
133°58'30"
133°58'00"

NOAA FORM 75-96
(10-83)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. F00432

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
17314	2/9/98	[illegible signature]	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. Full application of soundings and features from
			smooth sheets (Page size plots 1 of 3, 2 of 3, and 3 of 3).
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.